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The New England JOURNAL of MEDICINE

FORMERLY THE BOSTON MEDICAL AND SURGICAL JOURNAL

OFFICIAL ORGAN OF
THE MASSACHUSETTS MEDICAL SOCIETY
THE NEW HAMPSHIRE MEDICAL SOCIETY—THE VERMONT STATE MEDICAL SOCIETY
THE NEW ENGLAND SURGICAL SOCIETY—THE BOSTON SURGICAL SOCIETY, INC.
THE NEW ENGLAND PEDIATRIC SOCIETY AND
THE NEW HAMPSHIRE SURGICAL CLUB

OWNED AND PUBLISHED BY THE MASSACHUSETTS MEDICAL SOCIETY

Volume 200, Number 4 | Domestic $6 per Annum, 25c per Copy Canada $7.04, Foreign $7.56 | JANUARY 24, 1929 | Published Weekly in Boston at 126 Massachusetts Avenue

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The New England
Journal of Medicine

VOLUME 200 JANUARY 24, 1929 NUMBER 4

GALLBLADDER DISEASE*

BY JOHN B. DEAVER, M.D., F.A.C.S.†

GALLBLADDER disease is a large subject, and its manifestations are constantly being met with in one form or another. For this reason I hope it will appeal to you as a topic for discussion and that I may be able to give out some points of general interest.

Gallbladder disease may be acute or chronic. The chronic is of greater interest than the acute gallbladder, because it is more frequent and also because it is more easily mistaken for other conditions. The acute gallbladder most commonly occurs as the result of calculous obstruction of the cystic duct with resultant hydrops or empyema, especially the former, and is more easily recognized than the acute non-calculous gallbladder, the uncertainty in the diagnosis in most instances being due to confusion with a high-lying acute appendix. Sometimes a subacute perforated duodenal ulcer clouds the diagnosis, but this is rare since subacute perforated ulcer is not frequently seen. In most instances the acute gallbladder is simply inflammatory; however, there occasionally occurs a phlegmonous, a perforative and a gangrenous variety, the latter being the more serious. The phlegmonous is in reality an ultra-acute condition, an early stage of the perforative variety. The perforative and gangrenous acute gallbladders demand immediate operation, if the best interests of the patient are to be served.

The simple acute gallbladder will, in practically all instances, recover from the attack without operative interference, under the treatment of anatomic and physiologic rest. Recurrence, however, will take place and the condition will eventually become chronic.

The acute gallbladder is ushered in by vomiting, followed by acute pain and the early development of tenderness and rigidity of the overlying belly wall. The area of rigidity and the degree of tenderness depend upon the extent of the peritoneal irritation or the actual peritonitis, if present, as the case may be. In the phlegmonous, perforated and gangrenous acute gallbladder, particularly the perforative, the rigidity and tenderness are very much more pronounced than in the simple acute, so much so that the question of acute perforative peptic ulcer, characterized by board-like rigidity, may arise. In either case immediate operation should be performed. The constitutional symptoms in these conditions—fever, chill, increased pulse rate, and pain—are much more pronounced than in the simple acute variety, and the patient looks much sicker. The chief differential points in the diagnosis between the simple acute calculous and the simple acute non-calculous gallbladder, are the more severe attacks of paroxysmal pain in the former, which will require large and repeated doses of morphia for relief. While the pain of acute non-calculous gallbladder may be severe, it usually lacks the sting of that of the calculous variety. It must be remembered, however, that oedema of the walls of the cystic duct or incomplete obstruction by stricture in a gallbladder containing much inspissated and stagnant bile, the chief predisposing cause of infection, causes the pain of the acute calculous gallbladder. In either case the severity of the attack depends primarily upon infection and secondarily upon the degree of loss of function of the gallbladder.

Not infrequently the first attack of the simple acute gallbladder is so slight that the patient easily forgets about it, until close questioning recalls it to his mind. In later and more pronounced attacks he has no trouble in remembering his sufferings.

Equally important are symptoms occurring between the acute attacks, such as indigestion or dyspepsia, in the shape of distress soon after eating, nausea, gaseous distention, etc. Failure to elicit this history is a sin of omission, while not to make a most careful physical study is a sin of commission the more serious of the two. Personally, I attach more importance to the physical examination than to the history since feeling and seeing for oneself make for greater certainty than hearing. If all patients were highly intelligent, the last statement might be robbed of some of its value, for then the chances for a reliable history would be greater. I regard the palpation of a mass, the presence of rigidity, and decided tenderness as of paramount importance; this holds also in other conditions. I have in mind particularly the palpable mass in the pylorus where the question of cancer of the stomach arises. To feel (palpate) well is to diagnose well. Palpation is an art that can perhaps be

*Read before the New York and New England Association of Railway Surgeons, New York, October 13, 1928.

†For record and address of author see "This Week's Issue," page 202.

acquired, although lightness of touch is, I believe, inborn. To maul the abdomen by deep pressure with both hands gets one nowhere. Light palpation with the palmar surfaces of the index, middle and ring fingers makes it possible to feel accurately and to differentiate reflex muscle spasm and muscular rigidity, and gets one somewhere. I am not exaggerating the value of this method, and that oftentimes it is the only way a diagnosis can be made. I have particularly stressed this point as I am quite sure that there is a tendency toward getting away from the old and tried means of diagnosis and substituting some of the newer mechanical methods that are not always to be relied upon. In the simple acute gallbladder we are fortunately often able to feel the tender fundus moving up and down with respiration; this practically clinches the diagnosis. Incidentally I may remark that it may happen that a movable and slightly tender kidney is mistaken for an enlarged and tender gallbladder. This is more likely to occur in the subsiding than in the acute stage of the gallbladder inflammation after the rigidity of the overlying abdominal walls has subsided to some extent and they have become flexible, thus allowing of their being carried inward by the palpating fingers so that the fundus of the gallbladder, if enlarged and projecting beyond the lower edge of the liver, can be felt. It is useless to say that where the gallbladder lies entirely beneath the liver it cannot be felt, although pressure over the liver at the site of the gallbladder will elicit tenderness. To make this more evident, have the patient take a full breath and not expire for a few seconds, thus bringing the liver to a lower level; pressure then may be more effective in eliciting tenderness. Change in the position of the patient, having him lie upon the left side, the body being carried forward and the lower limbs strongly flexed, buckling as it were, with the ends of the index, middle and third fingers carried well into the abdominal wall at the lower border of the chest, may make one better able to palpate as well as to elicit tenderness. Usually the examination, with the patient lying upon his back, is satisfactory. In the movable and tender kidney, bilateral pressure should be exerted, the fingers of the left hand in contact with the costo-vertebral region and the fingers of the right hand directly over the site of the lower pole of the right kidney; having the patient take a deep breath, by gently alternating the pressure, the kidney can be felt moving up and down and can, or at least should be, differentiated from the gallbladder excursions during inspiration and expiration.

Let us next consider the symptoms, constitutional reaction and physical findings in the suppurative, phlegmonous, perforative and gangrenous acute gallbladder. At the outset I may say these occur most frequently in association with stone, and properly speaking come under the head of the acute calculous gallbladder.

In the severe cases the symptoms are those of simple acute gallbladder greatly exaggerated with pronounced signs of peritoneal involvement. Nausea and vomiting may be persistent, making a picture not unlike that of infection of the peritoneal cavity rather than one of only gallbladder involvement. The temperature is high, rising to 103° or 104° F. and the leucocyte and polynuclear count correspondingly high.

In the perforative case the symptoms are still more pronounced. In the early stage the abdominal rigidity and tenderness are so decided that it is only by the history, and not always then, that one can be sure one is not dealing with an acute perforated ulcer or an acute pancreatitis.

In the gangrenous gallbladder in the early stage, the symptoms are practically those of the phlegmonous type. The differential factor is that with the onset of gangrene the pain suddenly ceases. This likewise occurs in gangrenous appendicitis, namely, pain, chill, temperature and cessation of pain. In either case this sequence is a danger signal, an S. O. S. call for immediate operation. I have already said that acute appendicitis, when the appendix holds a high position, is the most common condition for which, in its early stage, the acute gallbladder is most likely to be mistaken. In both, the initial pain usually is in the epigastrium, although in the acute gallbladder vomiting precedes the onset of pain while in appendicitis pain precedes vomiting. In the gallbladder inflammation the vomiting is more persistent than in appendicitis, as in the latter it ceases as the pain shifts and localizes in the region of the appendix. In the early stage of either condition, unless the history is very characteristic, diagnosis is uncertain. I frequently am unable to make the differentiation at once, nothing being palpable; but by washing out the stomach and instituting anatomic and physiologic rest, familiar to you as the Fowler-Murphy-Ochsner treatment, rigidly observed in all its details, the diagnosis can usually be made in the course of six or eight hours.

The rationale of betterment, in so far as rendering palpation more certain, is the subsidence of the peritoneal irritation, the forerunner of peritonitis, which changes the condition of the abdominal walls overlying the lesion from that of marked rigidity to flexibility.

Let us now consider the chronic gallbladder. The chronic gallbladder has in the last few years come very much to the forefront, especially since the brilliant work of Evarts Graham, who, by cholecystography, has demonstrated a means of detecting the functional activity of the gallbladder. As Graham puts it, "Cholecystography is really a means of studying the functional activity of the gallbladder

rather than a means of indicating the exact pathology present." As a result of this declaration many more gallbladders for questionable disease are being removed than formerly.

In the Lankenau Clinic we have an x-ray or cholecystography examination only in those cases where clinical study is not positive, and when we are not reasonably sure of the condition of the liver and its ability to withstand operative attack. In these instances we make the cholecystographic study in order to determine the eliminating power of the liver. When the patient asks for x-ray examination, we have it made, but I rely most upon the history and the study of the patient. The physical examination, next to the information obtained from the history, satisfies me in advising for or against operation. The most important information gained in the physical examination is the presence of definite tenderness and rigidity, and the presence of a mass which, however, is not, by any means, present in all cases. Pressure over the healthy gallbladder will not elicit tenderness. Tenderness and rigidity in the diseased gallbladder are of as much moment from the diagnostic standpoint as are muscular rigidity and tenderness of the abdominal wall in the presence of intraperitoneal irritation the result of a serious lesion. The patient with tenderness and board-like rigidity of the abdominal wall immediately following most intense, acute, abdominal pain, or who has been the recipient of a severe blow upon the abdominal wall, should have the abdomen immediately opened. In the presence of these signs, to watch and wait is worse than dangerous, while to look and act is life-saving. I have made this my practice for years, with no regrets, for by it I have saved many lives; therefore I lay much stress upon the presence of tenderness and rigidity.

The chronic gallbladder may be an end result of the acute gallbladder, or it may be chronic from the beginning. Chronicity is the result of a low-grade infection and scant biliary drainage. The chronic gallbladder may be interstitial, the most common form, or catarrho-interstitial, or catarrhal. In either of the last two varieties, the tips of the villi of the mucous membrane which have undergone desquamation become bile-stained, or there are deposits of lipoids and cholesterin in the mucous membrane and the sub-mucosa,—a condition formerly termed "strawberry gallbladder" but more recently designated "cholesterosis." The chronic gallbladder may be either larger or smaller than normal, due in the former instance to distended thin walls filled with thick mucus and dark, often black, bile; while the small gallbladder is found in the longer standing cases and is due to organization and contraction of the products of the interstitial inflammation. This is exemplified in calculous obstruction of the common duct, where we usually find the gallbladder shrunken and much contracted.

Whether the chronic gallbladder is an end result of an acute inflammation or whether it is a chronic inflammation from the beginning, the cause in either case is infection. This infection is rarely a primary affair. In most instances the gallbladder is secondarily infected by organisms carried from elsewhere by way of the blood, the lymph, or the bile stream or by direct extension through contact with a neighboring organ.

Our mission is not only to remove the pathology but to prevent its extension, for when the pathology is extensive and has gone beyond the confines of the gallbladder, operation may only be palliative, not curative. Preventive surgery is as much the slogan of the surgeon as preventive medicine is of the internist. In chronic disease of the gallbladder, surgery cannot be done too early. Early surgery is most satisfactory to the patient and comparatively easy for the surgeon. This leads me to emphasize the fact that the gallbladder once infected is always infected. In view of this fact, the importance of early recognition of gallbladder symptoms becomes self-evident.

The most common source of infection is through the liver, carried by the portal system of veins and by the splenic vein. It will interest you to know the experience of the Lankenau Hospital Research Laboratory under the able Director, Stanley P. Reimann, pathologist, in the examination of many chronic gallbladders removed in our clinic as well as sections of liver removed with the gallbladder.

Much of the detail in this paper has been subjected to experimental tests by Dr. Reimann in the Lankenau Research Laboratory, beginning about 1920 and carried on until about 1926. The results have been published from time to time in clinico-pathological papers with appropriate deductions thereon.

Briefly stated, in experiments, with dogs and rabbits, of five different methods, including that of the excised strip of gallbladder wall, no definite contractions were ever recorded by gallbladder muscle except the ordinary tonus characteristic of smooth muscle in general. All attempts to obtain contractions proved failures, at first, on account of a technical difficulty, namely, that of eliminating respiratory movements from the tracing; these were later compensated by appropriate arrangement of levers. It was also established that the different lobes of the liver in a dog do not secrete at the same rate over a period of twenty-four to thirty-six hours, neither is the composition of the bile as secreted, uniform; nor is the composition of the various biles coming from the different lobes of the liver at all times uniform. This was found to be related to the blood supply, in which, the portal vein, dividing shortly after it is formed, sends a left branch, which carries more blood from the upper part of the intestinal tract to the left lobe of the liver, and a

right branch, carrying more from the lower part of the abdomen. This fact is easily demonstrable by India ink injections or, as others have shown, by the injection of emulsified fat. A more direct way of estimating the concentrating ability of the gallbladder was brought out by placing a cannula in the gallbladder after tying off all the hepatic ducts and connecting this cannula to a source of supply of normal salt solution. When pressure was exerted on the salt solution equal to, approximately, a mean pressure of bile as secreted from the liver (about 100 millimeters), the salt solution was seen to disappear at the rate of about one cubic centimeter in five minutes, the rate varying naturally with the pressure exerted. Most of this salt solution apparently passed out into the lymphatics, for the networks in the gallbladder walls and on the peritoneal surface were brought sharply in relief, and oedema of the gallbladder walls developed in approximately one hour. To determine whether substances other than salt solution were absorbed, a small quantity of phenolsulphonephthalein was added; by nicking one of the larger lymphatics with a knife, the colored fluid could be seen to run out. The addition of iron, in the form of a weak solution of ferric chloride, was followed by a positive reaction in the fluid exuding from the lymphatics. Thus, phenolsulphonephthalein, normal salt solution, and iron at least can be absorbed by the lymphatics. That particulate matter also is absorbed can be shown by inserting diluted India ink suspensions in the gallbladder and varying the experiments in several directions. This particular matter passes through the walls of the gallbladder, down the cystic duct and toward the head of the pancreas as well as into the gallbladder bed of the liver, and even around into the lymphatics in the peritoneal surface of the dome of the liver. This and other experiments, as already stated, have been recorded in other papers published from time to time during the last seven or eight years.

Recently we cultured seventy-five gallbladders and seventy-five cystic lymph nodes, sometimes two cultures from the same case, with the following results. Thirty-seven cultures from the gallbladder walls were positive; twenty-nine from cystic nodes were positive; thirty-eight from gallbladder walls were negative; forty-six from cystic nodes were negative. Only two of the gallbladders showed organisms in the bile. In every case in which a growth was obtained from the cystic node, there was also a growth from the gallbladder in the same specimen, while in eight cases there was growth in the gallbladder and none in the cystic node. The bacteria were:

Non hemolytic streptococci	15
Staphylococcus albus	18
B. coli communis	2
Pneumococcus, type IV	1
Diphtheroid bacillus	1

Agglutination reactions are done on all of these organisms using the patient's serum. These results still require some additional work.

These findings, you will agree, demand the treatment we carry out in our chronic gallbladder cases.

Disease of the gallbladder means disturbed function of the gallbladder. To interpret disturbed function of an organ we first must be familiar with the normal function or normal physiology of the organ in question. The understanding of pathological physiology is as important to the clinician and the diagnostician as is the knowledge of pathological anatomy. We must admit that the chief essential of the clinician is a thorough working knowledge of pathological anatomy,—that which made the late Sir William Osler the master diagnostician of his day. The surgeon of large operative experience, who, in his early years, has been fortunate enough to have served an apprenticeship under a master pathologist in the post mortem chamber, can better correlate his observations in his numerous autopsies in vivo. In the surgical amphitheatre the knowledge he gains in observing the pathology of the living gives him a double opportunity which his medical colleague never has. In other words, the surgeon who, for the better part of a lifetime, has uninterruptedly worked in the operating room should possess a cerebral museum rich in specimens of pathology, upon which he can draw, correlating the symptoms of disease and matching them up with the causes responsible for the symptoms, the physical findings, etc.

Let us for a moment consider the functions of the gallbladder. Removal of the gallbladder in no way affects the physiological processes of the individual. From secondary operations we know that the common and hepatic ducts, after the removal of the gallbladder, are larger than normal. Rutherford Morrison, in 1916, called attention to this, as well as to the fact that in cases of natural cure of a calculous cholecystitis, where the gallbladder is much contracted and out of function, nature performs a cholecystectomy. It is further believed that in these circumstances the muscle of Oddi is no longer responsive, thus allowing the common duct to drain continuously, explaining the rationale of cure in removing the infected gallbladder in early chronic pancreatitis before cirrhosis has occurred.

In considering the functions of the gallbladder, the much discussed question of contractile power is pertinent. Personally I have never seen the gallbladder contract. I have often toyed with it, as it were, by gently palpating it, hitting it lightly with the end of blunt scissors, or the handle of the scalpel and pricking it with the point of a needle, but without any result. In contrast to this, the same sort of manoeuvers applied to the pylorus, where there has been pylorospasm, will result in strong con-

traction of the muscle fibers, causing a corrugated appearance of the surface of the pyloric antrum. I constantly demonstrate this at operation. The higher development of the musculature of the stomach, I take it, explains this phenomenon, since the gallbladder and the stomach are both well supplied with nerves. What I have frequently observed, when pinching or compressing the walls of the gallbladder in the interstitial type of the disease, is the slow recovery to their normal contour indicating loss of contractile power. The recovery of the normal contour of the normal gallbladder when compressed is prompt, in fact taking place immediately upon relief of the compression, and with no irregularity of the walls as in the former instance. The slowness with which the contour of the walls of the gallbladder recover indicates abnormality and therefore is of pathological significance. I stress this at operation. When I am able clearly to demonstrate this, I am in the habit of saying, "the gallbladder has lost its pep." This brings it home to students better than by giving a more scientific explanation. I believe, therefore, the gallbladder has contractile power notwithstanding adverse opinions. In making this declaration I am mindful of the presence of elastic tissue in its walls that allows of a certain amount of recoil. With Moynihan I believe the musculature of the gallbladder is capable of activity as shown by the occurrence of hepatic colic. According to Moynihan the colic is due, not to the contraction of the muscle fibres, but to their stretching, and colic cannot occur unless muscle fibre is present.

The most important function of the gallbladder is absorption and next in order, excretion. Absorption is illustrated at operation by the absence of bile in the gallbladder where the cystic duct has been obstructed. Roux and McMaster have shown that the bile in the gallbladder is concentrated to from one-sixth to one-tenth of its bulk by absorption of fluids carried off by the blood stream and the lymph vessels. This concentration of bile, which is another function of the organ, cannot take place if the absorptive function is destroyed by choking of the capillaries and lymphatics.

The part that the lymphatics play in the absorption of the liquid contents of the bile and in carrying infection from the gallbladder is important in the study of the sequelae of gallbladder disease and especially in explaining the continuance or recurrence of symptoms after late operation. Crile believes that certain symptoms following gallbladder operation and persisting for two years or longer are the result of disturbances of the innervation of the region of the liver, gallbladder and common duct, and as he puts it, anything that interferes with this system of innervation, interferes with the whole group of organs. Since the veins of the gallbladder, tributaries of the portal vein, play a part in the rôle of the concentration of the bile in that they carry away some of the liquid contents, they also carry infection into the portal circulation, affording an indirect route through which infection is carried to the liver. That the gallbladder possesses an excretory function is true, as instanced not only from Dr. Reimann's experiments but by others as well and by the surgeon's operations. Moynihan states that the mechanism by which the gallbladder empties itself is complex.

The avenues by which infection reaches the gallbladder are the lymphatics, the bile stream, the arterial and venous blood streams, the cystic artery and the portal vein, the latter carrying two streams one derived from the alimentary canal and the other from the spleen. The latter is suggested, in some cases of chronic hepatic disease, by the presence of fibrosis of the spleen and perisplenic adhesions.

Organisms invade the walls of the gallbladder by direct extension from neighboring organs, particularly the pylorus, duodenum, pancreas and liver. Rosenow's work upon hematogenous infection and the elective affinity of certain organisms stands out as monumental, and has served as an inspiration to the surgeon in his advocacy of early radical operation. Bond's work upon retrograde submucous currents through the alimentary canal was epoch-making. Bond, as you doubtless know, demonstrated that colored fluids introduced into the rectum could be recognized in the discharge from the gallbladder after cholecystostomy.

What it is best to do with the chronically diseased gallbladder depends chiefly on the clinical, and incidentally the laboratory evidence; the latter, however, must fit in with the former, otherwise the best results will not be attained. I personally believe, other things being equal, that the chronic gallbladder cannot be removed too early for the following reasons: first, medical treatment, which includes all forms other than operative, cannot eradicate the pathology of the chronic gallbladder nor can it restore disordered function, such as the power of absorption and excretion, concentration of bile, or the contractile power, since it cannot remove the pathology responsible for the impaired or lost function. If medical treatment cannot remove the pathology, it is powerless to prevent extension of the pathology, and extended pathology in most instances means embarrassment of the pancreas and subsequent disease of this organ, which, if far advanced, complicates otherwise simple surgery. The chronically infected gallbladder likewise exposes the liver, the intra- and extra-hepatic ducts, the heart and the kidneys to serious damage, while the embarrassment of adjacent organs by crippling pericholecystic adhesions is a familiar sight. Furthermore, the chronic gallbladder, if not recognized and operated early, favors the formation of stones, which, in many instances, migrate

to the common duct, causing obstruction of the duct with disastrous consequences, for example, jaundice, blood dyscrasia, cirrhosis of the liver, acute pancreatitis, chronic pancreatitis, carcinoma, etc. Every time I operate for calculous obstruction of the common duct I feel that somebody has not been on the job, having failed to recognize the futility of medical treatment and neglected to have the gallbladder removed before the stone or stones migrated into the common duct. Here, as elsewhere, delay often means the loss of life. The chronic gallbladder too often is passed on to the surgeon at a time when it offers embarrassment, disappointment, trials and tribulations.

I could hoist more danger signals, but I hope those I have mentioned are enough to impress you with my viewpoint, which I hope from now on will be yours. The price the patient pays is retrogression of symptoms, causing the latent stage to be misjudged as a cure until an acute exacerbation occurs. It is during the latent stage that gallstones are forming and the chronic infection making systemic inroads that sooner or later endanger the life of the patient, if not induce the sleep from which there is no awakening. Early operation means a short operation, at the most opportune time, when the anatomy is not distorted, the light-houses are clearly seen and the way to the harbor unobstructed, making for a sure and safe landing. Early operation means that no drainage is required, which, in turn, avoids post-operative adhesions, hernia, recurrence of symptoms and makes for a short and uninterrupted convalescence, all of which add to the renown of the diagnostician and the surgeon, to say nothing of the satisfaction to the patient and his friends; can I say more in favor of early operation?

THE OCCURRENCE OF POLIOMYELITIS FOLLOWING TONSILLECTOMY*

BY W. LLOYD AYCOCK, M.D.,† AND ELIOT H. LUTHER, M.D.†

IN 714 out of 1,224 cases of poliomyelitis reported in Massachusetts in 1927 and in Vermont in 1927 and 1928 certain information regarding tonsillectomy is available. In 497, or 70 per cent., of the 714 cases tonsils were present, and in 217, or 30 per cent., tonsillectomy had been done at some time prior to the attack of poliomyelitis. Kaiser[1] reports that 20,000, or 41.5 per cent., out of 48,000 school children examined had had their tonsils removed, most of them at least five years previously. Figures from the Massachusetts Department of Public Health show that of 10,098 school children examined 3,281, or 32.9 per cent., had had tonsillectomy. The age distribution of the school children represented in these two sets of figures is not available for a more exact comparison between school children in general and cases of poliomyelitis in regard to tonsillectomy. However, the percentage of cases of poliomyelitis giving a history of tonsillectomy is so near that of school children in general that the presence or absence of tonsils does not seem to influence the occurrence of poliomyelitis to any considerable extent.

For 186 out of the 217 cases in which tonsils had been removed, the time intervening between tonsillectomy and the attack of poliomyelitis is stated in years. This is shown in Chart 1.

In view of the fact that poliomyelitis is predominantly a disease of childhood, the increased frequency of the shorter intervals in years does not appear to be of significance with the exception of the seemingly high proportion of cases having had their tonsils removed within one year.

Of the 36 cases in which there was a history of tonsillectomy within one year of the attack of poliomyelitis, the interval between the operation and the attack is stated in months. This is shown in Chart 2. The strikingly large proportion of cases in which tonsillectomy had been done within one month of the onset of the disease gave rise to the suspicion that this operative procedure might in some way influence infection with the virus of poliomyelitis.

It will be noted that all of the cases giving a history of tonsillectomy within one month of the attack of poliomyelitis had had this operation performed between 7 and 18 days prior to the onset of the disease. No case occurred under 7 days and none from the 18th to the 30th day.

This striking concentration of 16 out of 36 cases in which tonsillectomy had been performed within a year, into a time period of from 7 to 18 days preceding the onset of the disease, suggests a causal relationship between the operation for the removal of tonsils and the occurrence of poliomyelitis in exceptional instances. It may be noted that this group of cases comprises 2.5 per cent. of all the cases upon which information is available regarding tonsillectomy. The interval between tonsillectomy and the onset of disease corresponds to the incubation period of the disease, as indicated by studies relating to multiple cases in families[2], the interval between known exposure and the disease in certain contact cases, and in milk-borne epidemics[3], as well as the incubation period of the experimental disease in monkeys.

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This work is supported by the Harvard Infantile Paralysis Commission and a fund privately donated to the Vermont Department of Public Health.

†For record and address of author see "This Week's Issue," page 202.

REPORT OF CASES

1. P. L., male, age 6 yrs., had a tonsillectomy Sept. 27, 1927. On Oct. 12 he became ill with fever, headache, pain in the back of the neck, retraction of the head and constipation. On Oct. 14 paralysis appeared involving the right arm, left side of the face, right leg and the muscles of respiration. Muscle examination on Nov. 3 by the after-care department of the Harvard Infantile Paralysis Commission showed considerable residual paralysis.

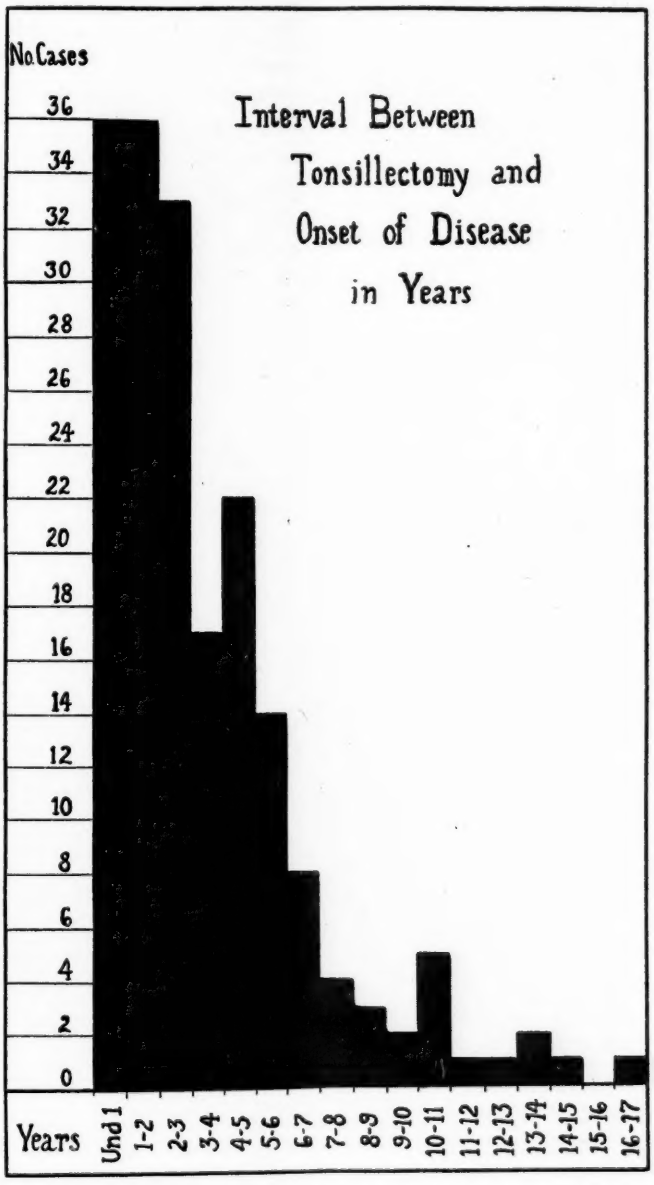
2. L. G., female, 4½ yrs., had a tonsillectomy Aug. 31, 1927. On Sept. 12 she took sick with fever, headache and generalized pain. This was followed by paralysis of the right leg. When examined on Oct. 14 she was found to have residual paralysis.

3. D. F., female, age 3 yrs., tonsillectomy July 29, 1927. Aug. 12 fever, vomiting and retraction of the head. Aug. 14 paralysis of the right leg. She also had residual paralysis on Aug. 30, 1927.

4. J. S., female, age 7 yrs., tonsillectomy Aug. 11, 1927. Aug. 21 fever, vomiting and constipation. Aug. 22 paralysis of the muscles of deglutition. She was removed to the Children's Hospital of Boston where the diagnosis was confirmed. Lumbar puncture on Aug. 23 yielded a clear fluid under normal pressure; globulin trace; cell count 63.

5. C. S., female, age 13 yrs., tonsillectomy Aug. 22, 1927. Aug. 29, fever, headache, vomiting and constipation. Aug. 31, paralysis involving the palate, pharynx, right side of the face and right deltoid. Muscle examination done later showed marked residual paralysis.

CHART 1



6. G. D., male, age 4 yrs., tonsillectomy on Sept. 23, 1927. Oct. 11, fever, vomiting and constipation. Oct. 14, paralysis of the muscles of deglutition.

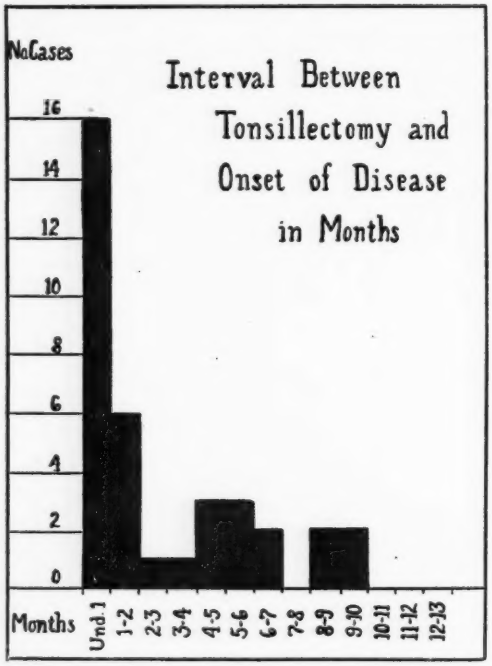
7. D. B., female, age 4 yrs., tonsillectomy July 28, 1927. Aug. 15, fever and constipation. The patient developed paralysis of the right arm, thigh, leg and foot. The diaphragm became paralyzed and she died on Aug. 18. Autopsy findings confirmed diagnosis.

8. J. K., male, age 3 yrs., tonsillectomy July 20, 1927. Aug. 5, difficulty in speech and vomiting. This was followed by regurgitation of fluid through the nose. Death occurred on Aug. 7. This incomplete history was obtained after the death of the child and further diagnostic data could not be ob-

tained. This case occurred during an outbreak of the disease in the city in which he lived. The history is consistent with poliomyelitis involving the muscles of deglutition.

9. R. H., female, age 6 yrs., tonsillectomy Aug. 26, 1927. Sept. 9, fever, headache and constipation. Sept. 12, the patient developed paralysis involving right side of face, both deltoids, left quadriceps and hamstrings on the right.

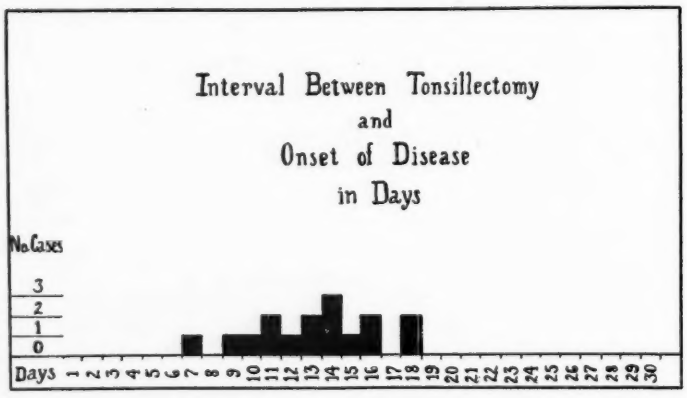
CHART 2



10. M. D., female, age 8 yrs., tonsillectomy Aug. 11. Aug. 27, fever, vomiting and constipation. Aug. 30, she developed paralysis of the palate and left arm.

This group of cases was further investigated and the exact interval in days elapsing between tonsillectomy and onset of disease was ascertained. This is shown in Chart 3.

CHART 3



11. H. D., female, age 8 yrs., tonsillectomy Aug. 6, 1927. Aug. 20, fever and vomiting. Aug. 24, paralysis of the left arm.

12. F. B., male, age 7 yrs., tonsillectomy July 29, 1927. Aug. 9, fever, headache, vomiting and constipation. Aug. 11, difficulty in swallowing and weakness of the anterior neck muscles. Spinal fluid examination Aug. 13: Pressure 100 m.m. of water; cell count 120 leucocytes, 60% lymphocytes; globulin positive.

13. M. McC., female, age 4 yrs., tonsillectomy Nov. 4, 1927. Nov. 13, fever, vomiting and constipation. Nov. 14, paralysis of the muscles of deglutition followed by involvement of the diaphragm.

14. V. C., female, age 4 yrs., tonsillectomy July 28, 1927. Aug. 10, fever, vomiting, constipation and pain in the back of the neck. Paralysis of the neck and throat appeared. She was admitted to the Lynn Contagious Hospital as a case of post diphtheritic paralysis. However no history of diphtheria was obtainable. Examination revealed the presence of meningeal signs and a lumbar puncture showed an increase in lymphocytes in the spinal fluid and a positive globulin. She died on Aug. 13.

15. J. McC., male, age 3 yrs., tonsillectomy June 30, 1927. July 11, fever, vomiting, retraction of the neck and drowsiness. July 13, paralysis of the muscles of deglutition and of the left side of the face.

16. L. M., male, age 25 yrs., tonsillectomy July 28, 1928, with post-operative hemorrhage, for which serum was given. Aug. 5, chill, followed by urticaria, fever and vomiting. This cleared up in 24 hours. Aug. 10, the patient noticed prickling in his arms and pain in his shoulder at night. On Aug. 15 he developed weakness of his right arm. He was examined on Sept. 8 and found to have moderate paralysis of the right deltoid and serratus magnus.

DISCUSSION

Occasional cases of poliomyelitis have previously come under our observation where the disease shortly followed tonsillectomy. It has been thought that the physician removing the tonsils was possibly a carrier and infected the patient at the time of the operation. Except in one instance, no two cases in this series were operated upon by the same physician. In one city where four of these cases occurred, three of them were operated upon by the same physician, but at different times. In view of the fact that poliomyelitis was prevalent at the time and that the statement was made that during the month in which these cases occurred he had performed upwards of 200 operations for tonsillectomy, we are not inclined to associate these cases with the physician who performed the operations. The manner in which this operation may influence the occurrence of the disease is not known, but it is suggested that the disease may follow the operation for the reason that this procedure opens up the pathway of infection to the

virus, which may already be present in such individuals.

Another unusual feature of this series of cases is the involvement of the palate or muscles of deglutition in 9 of the 16 cases. In 5 of these there was no other known involvement. The possibility of post diphtheritic paralysis should be considered. A diphtheritic membrane might well have been overlooked, due to the condition of the throat following tonsillectomy. In all but one of these cases (Case No. 8, in which the history was incomplete) the onset of paralysis was preceded by a definite febrile illness consistent with poliomyelitis. In three of the five the diagnosis was confirmed by lumbar puncture. Although the proportion of deglutition cases is much higher in this small series than in the 1927 cases in general, the frequency of this type of case varies in different epidemics and in different localities. It cannot be stated with certainty that tonsillectomy was responsible for this localization of paralysis.

SUMMARY

Evidence is presented which indicates a causal relationship between tonsillectomy and the occurrence of poliomyelitis in a comparatively small number of instances. The interval elapsing between tonsillectomy and the onset of the disease in this group of cases corresponds to the incubation period of the disease as indicated by other evidence. This suggests that in such rare instances the setting up of infection by the virus of poliomyelitis is in some way associated with tonsillectomy.

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THE VARIATIONS OF BLOOD PRESSURE IN THE EXTREMITIES*

BY JAMES M. STRANG, M.D.†

A CONSIDERATION of the mechanics of the normal circulation is important in any attempt to diagnose circulatory pathology by the aid of observations of pressure difference in different extremities. In this connection, the normal variations in blood pressure in different parts of the body must be taken into account. Hydrostatic pressure plays an important rôle in this problem. This report, however, details studies which demonstrate that there normally occurs a blood pressure difference between the arm and the leg which is quite independent of hydrostatic pressure.

A brief review of the literature shows that, prior to 1924, the prevailing opinion was against this conception. Meakins[1], in his recent monograph, stated that the evidence at present supports the contention of Leonard Hill that there is no significant difference between the blood pressure of the arm and leg except that which is accounted for by hydrostatic pressure. Hill published data in 1909[2, 3] and later in 1912[4] in which he demonstrated a close correlation between the observed pressures in the arm and leg in the horizontal and vertical positions and the pressures calculated on the basis of hydrostatic pressure. Taussig[5] observed in 1916 that, in a series of nine toxic goitre patients, the pressures in the thigh were thirty-seven millimeters higher than in the arm. Williamson[6] reviewed the subject of pressure differences in aortic insufficiency in 1921. He concluded that there is no evidence that the pressure differences were associated with aortic insufficiency rather than with arteriosclerosis.

In 1924, Bazett[7] discussed a possible mechanism whereby the pressure in the thigh might be higher than in the arm. Burdick[8], one year later, recorded photographically the pressure changes in the thigh and arm in four cases. He concluded that there is a difference of thirty-eight millimeters between the pressure in the thigh and arm in the horizontal position and that this difference increases with exercise to sixty-eight millimeters.

METHOD

There is so much uncertainty as to the normal values for blood pressure that it is necessary to minimize the individual variations by utilizing the averages of series of observations. Our cases were divided into three groups with thirty, eleven and thirteen subjects respectively. The average values for each group were compared with those for each other group and with those of the whole series. An extraordinary and quite unexpected agreement was found.

The subjects were all of the same age period, eighteen to twenty-eight years. Their health and activities were normal. Nine men and forty-five women were examined. No significant sex difference was observed.

All observations were made with a mercury manometer by the auscultatory method. Readings in each position were taken until successive

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readings were practically constant. By this procedure, it was felt that the influences of rest and of the exertion of changing position would be minimized. A standard cuff measuring thirteen centimeters in width was used on the arm and lower leg. For the thigh, this cuff was reinforced by a special cuff fifteen centimeters wide and frequently by a third cuff twenty centimeters wide. The readings designated "Arm" were made with the cuff on the upper arm and the stethoscope in the antecubital fossa. For "Ankle" readings, the cuff was placed on the leg two to four inches above the ankle and the stethoscope in the vicinity of the posterior tibial artery. "Leg" readings were made with the reinforced cuff on the thigh and the stethoscope in the popliteal fossa. The usual precautions were taken at all readings.

Readings were made in three positions: horizontal, limb elevated and standing. The subjects were allowed to rest on a bed for several minutes before taking the initial observations. After the readings in the horizontal position were taken, and with the patient lying on his back, the leg, and subsequently the arm, was held vertically by an assistant for the second group of readings. With the cuffs still in place, the subject then stood on a chair and the final readings were taken a few minutes later. Between twenty and thirty minutes were devoted to each case.

There are many possible criticisms which might be advanced against the method. Burdick[8] states: "The auscultatory methods are probably very unreliable in the popliteal space". He gives no reason. It has been demonstrated that a minimum cuff width of ten centimeters is essential for proper arm readings. If the principle underlying this demonstration is valid, the reinforced cuff should be adequate for the occlusion of the femoral vessels.

The sound changes in the leg are as sharp and clear-cut as in the arm. Just as the sound transmission in the arm of a fat person is less satisfactory than in a person with normal subcutaneous fat, so the transmission in the popliteal space of well-nourished women is somewhat impaired. This factor may influence individual readings, but will not materially alter the averages of a series.

Auscultation over the posterior tibial artery is relatively easy in men, somewhat more difficult in women. Auscultation at the ankle is practically impossible when the leg is raised and when the patient stands. This may be due in part to the low pulse pressure as well as to the subcutaneous fat deposits. In the majority of women of the first series, the sounds could not be heard at the ankle, hence this observation was not even attempted in the second and third series except in subjects with unusually thin ankles.

The observation of the systolic pressure in the leg when standing is one of the most difficult and perhaps one of the least reliable. There are two important reasons for this. First, the observations were made soon after the subject stood. Several minutes are required for the systolic pressure to drop and the diastolic to rise to stable values after the exertion. Secondly, the discomfort caused by the cuff at pressures of two hundred or over militate against too long or too frequent observation.

The relative merits of auscultation and palpation are not relevant to this discussion. If the auscultatory method is satisfactory for the arm, it is difficult to see why it cannot be applied to the thigh or ankle provided that an adequately wide cuff is used. Taussig[5] used a reinforced cuff with auscultation and obtained exactly the same results for thigh pressures as Burdick with his photographic method. Furthermore, these data are of the same order of magnitude as our own. It seems to us that the auscultatory method is as reliable as the method of Hill and of Williamson, which was dependent upon palpation of the posterior tibial artery.

It is not possible for a single observer to take pressure in the arm and leg simultaneously. An attempt was made to estimate the importance of this factor by using two sphygmomanometers and by taking pressures successively in the arm, leg and arm. Twenty-four cases were studied in this manner. The intervals between the readings were not more than a few seconds. No significant differences could be obtained between the arms pressures taken before and after the leg pressures.

Hill and his associates noted that the repeated compression and decompression of the cuff caused a preceptible lowering of the ankle pressure. In consequence, they discarded the first readings and used only those obtained after several compressions. We have not been able to obtain this pressure change using auscultation.

Taussig has raised the question of the influence of emotion on the observed pressures. He believed this factor to be especially significant with reference to the thigh pressures in women. Repeated observations of the pulse rate and blood pressure in the arm before, immediately after the application of the thigh cuff and immediately after taking the thigh pressure were made in twenty-four cases. The variations in pulse rate and arm pressure were very slight, the trend of both being downward rather than upward.

The evaluation of the influence on blood pressure readings of the tonic contraction of the muscles under the cuff, such as occurs in the thigh when standing, was attempted. A large number of observations were made upon arm and leg in all positions, although muscle sounds introduced a disturbing factor in many cases. In the arm, there is no significant difference between readings taken before and during contraction. In the leg, the differences are some-

what greater, especially when standing. The general trend is toward a lowering of the systolic and an elevation of the diastolic pressures. In but three cases were the variations associated with muscular contraction greater than five per cent. and all three of these were difficult cases in which all of the readings showed marked deviations from the average figures.

OBSERVATIONS

It is very difficult to determine the presumptive accuracy of studies of blood pressure determinations. An attempt has been made to approximate this information by noting the proportion of the readings of each series which falls within plus or minus ten per cent. and twenty per cent. of the average figures for the series. Table I expresses these findings for the series of primary observations.

It appears therefore that sixty per cent. of the readings fall within ten per cent. of the averages and eighty-five per cent. of them within twenty per cent. It might be expected that the readings of systolic pressure in the arm would be the most accurate of all and would probably reflect the accuracy of the method as well as the variation to be expected in any series of normal persons. With this point in mind, the agreement of the ranges of variation of the other data, such as the leg lying, has increasing significance.

The table shows that the range of variation of the several series of readings compares favorably with that of the arm readings. The amount of deviation appears to be no greater than might be expected in any group of normal subjects.

The observations made on fifty-four subjects have been condensed into the following table. The average pressures are given in millimeters of mercury. No observations of the effect of elevation of the limbs were made on the first series. Ankle observations were omitted on the last group and were satisfactory in only a small percentage of the first and second groups in the standing position.

	Place	Position	Average Pressure	Observations within ± 10% of Average	Observations within ± 20% of Average
			Mm.		
SYSTOLIC PRESSURE	Arm	Lying	113	70%	90%
		Standing	111	60%	90%
	Leg	Lying	145	70%	90%
		Standing	200	45%	70%
	Ankle	Lying	114	60%	90%
		Standing	196	80%	100%
DIASTOLIC PRESSURE	Arm	Lying	72	45%	90%
		Standing	82	50%	90%
	Leg	Lying	103	50%	75%
		Standing	159	60%	90%
	Ankle	Lying	87	70%	80%
		Standing	167	90%	90%
Average				60%	85%

TABLE I

Variation of Observations from the Average Pressure for Each Position

These figures indicate that the blood pressure varies considerably in different parts of the body and in the same part with changes of position. The blood pressure in the arm is numerically the same lying and standing after the influence of the exertion of changing position has worn off. Furthermore, simultaneous determinations of pulse rate show no appreciable change. When the subject stands, the diastolic pressure in the arms tends to rise with a consequent drop in pulse pressure. In other respects, the diastolic pressure in the arm varies with the systolic.

The leg readings were everywhere higher than those of the arm and, in the standing position, higher than the ankle. It is interesting to note the high pressures to which the leg vessels are subjected. In normal people, systolic values often run above two hundred millimeters. The pulse pressure in the leg corresponds to that of the arm except when standing.

Attention is called to the similarity between the systolic pressures in the arm and ankle when lying. This observation agrees with the reports of Hill. The pulse pressure, however, is diminished at the ankle to two-thirds of that noted elsewhere. In the standing position, the pressures borne by the ankle vessels are almost as great as those of the leg vessels.

DISCUSSION

The differences in pressure which were noted in a given part with change of position are shown in Table III, which is constructed, as indicated, by subtracting the average figures of Table II.

	Position	ARM		LEG		ANKLE	
		No. of Observations	Pressure	No. of Observations	Pressure	No. of Observations	Pressure
			Mm.		Mm.		Mm.
SYSTOLIC PRESSURE	Lying	54	113	54	145	58	114
	Raised	24	93	20	127	-	-
	Standing	54	111	52	200	11	196
DIASTOLIC PRESSURE	Lying	54	72	54	103	58	87
	Raised	24	50	20	95	-	-
	Standing	54	82	52	159	11	167
PULSE PRESSURE	Lying		41		42		27
	Raised		43		32		-
	Standing		29		41		29

TABLE II

Average Blood Pressures in Different Positions

In the arm, standing causes no change in the systolic pressure, but does elevate the diastolic and consequently reduces the pulse pressure. Raising the arm drops both systolic and diastolic pressure over fifteen per cent.

	ARM		LEG		ANKLE
	Standing minus Lying	Lying minus Raised	Standing minus Lying	Lying minus Raised	Standing minus Lying
	Mm.	Mm.	Mm.	Mm.	Mm.
SYSTOLIC PRESSURE	-2	20	55	18	82
DIASTOLIC PRESSURE	10	22	56	8	80
PULSE PRESSURE	-12	-2	-1	10	2

TABLE III

Differences in Pressure in Extremity Due to Change of Position

In the leg, a change from lying to standing increases the systolic pressure forty per cent. and the diastolic sixty per cent. Elevation of the leg produces a drop quite comparable to that observed in the arm.

The systolic and diastolic pressures at the ankle increase seventy and one hundred per cent. respectively, when the subject stands. There is no change in pulse pressure.

It is important to recall that the pressures in arm and ankle when lying are the same. It follows that the pressure differences between ankle, standing and lying, and between arm, varying from thirty to eighty per cent. The systolic and diastolic pressures change in approximately the same proportion as is shown by the minor changes in pulse pressure. The "leg-arm" difference is more than twice as great standing as lying. The "ankle-arm" difference is negligible when lying, but when standing, is increased to slightly less than the "leg-arm" value. The systolic "leg-ankle" difference is about twenty-five per cent. when lying. This diminishes to practically nothing when standing.

	Position	Leg Pressure minus Arm Pressure	Ankle Pressure minus Arm Pressure	Leg Pressure minus Ankle Pressure
		Mm.	Mm.	Mm.
SYSTOLIC PRESSURE	Lying	32	1	31
	Raised	34	-	-
	Standing	89	85	4
DIASTOLIC PRESSURE	Lying	31	15	16
	Raised	45	-	-
	Standing	77	85	-8
PULSE PRESSURE	Lying	1	-14	15
	Raised	-11	-	-
	Standing	12	0	12

TABLE IV

Influence of Position on the Differences between Pressures in Specified Extremities.

standing, and ankle, standing, are practically identical. This observation aids in a correlation of Hill's data with our own.

From the above observations, it will be seen that there is a noteworthy readjustment in blood pressure relations in each of the different parts with change of position.

In contrast to the facts noted above, a comparison of the differences between blood pressures in the leg and arm in the various positions reveals certain fairly large discrepancies. Table IV summarizes the data derived from Table II.

It may be noted at once that both the systolic and diastolic pressures are higher in the leg than in the arm in all positions, the differences

An attempt has been made to evaluate the part which hydrostatic pressure plays in the two phenomena described above. For this purpose, twenty-four cases were studied in detail. An analysis of the differences in pressure noted in a given part with change of position is recorded in tables Va and Vb, which deal with arm pressure and leg pressure respectively.

Table Va shows the influence of hydrostatic pressure on the pressure changes in the arms in different positions. For the "Raised" data,

	Position	Arm Pressure	Difference from Pressure Lying	Length Arm	Mercury Equivalent	Calculated Pressure	Difference from Observed Pressure	Per cent. Difference
		Mm.	Mm.	Cm.	Mm.	Mm.	Mm.	-
SYSTOLIC PRESSURE	Lying	114	-	-	-	-	-	-
	Raised	93	-21	24	18	96	3	3%
	Standing	112	-2	14	10	124	12	9%
DIASTOLIC PRESSURE	Lying	72	-	-	-	-	-	-
	Raised	50	-22	24	18	54	4	7%
	Standing	85	13	14	10	82	3	3%

TABLE Va

Blood Pressure in Arm in Different Positions : Observed and Calculated

the length of the arm is the distance from approximately one-half of the anterior-posterior diameter of the chest vertically to the point of application of the stethoscope on the arm. In the standing position, the vertical distance from the level of the apex of the heart to the antecubital fossa was taken. The hydrostatic pressure was calculated from the formula (height of column in millimeters x 1.05—specific gravity of blood) 13.6—specific gravity of mercury—equals millimeters of mercury pressure. The calculated pressure (column 7) is obtained by adding to or subtracting from the lying pressure the appropriate value. It will be seen that the observed values differ from the calculated values by only five per cent. on the average.

	Position	Leg Pressure	Difference from Pressure Lying	Length Leg	Mercury Equivalent	Calculated Pressure	Difference from Observed Pressure	Per cent. Difference
		Mm.	Mm.	Cm.	Mm.	Mm.	Mm.	
SYSTOLIC PRESSURE	Lying	144	-	-	-	-	-	-
	Raised	127*	-17	31*	24	120	7	5%
	Standing	197	53	73	56	200	3	2%
DIASTOLIC PRESSURE	Lying	104	-	-	-	-	-	-
	Raised	95*	-9	31	24	80	15	18%
	Standing	163	59	73	56	160	3	2%

*Based upon twenty determinations

TABLE Vb

Blood Pressure in Leg in Different Positions : Observed and Calculated

eighty-two millimeter difference between the ankle lying and standing, which corresponds to a column of blood one hundred and six centimeters high. This is approximately the distance from the apex of the heart to the ankle. This approximation is in accord with the data of Hill. He concluded that hydrostatic pressure is, therefore, the only factor operating to change blood pressure with different positions. This statement is explained, as we have shown, by the fact that the ankle and arm pressures are identical in the lying position.

	POSITION	OBSERVED Leg Pressure minus Arm Pressure	Hydrostatic Influence	CORRECTED Leg Pressure minus Arm Pressure
		Mm.	Mm.	Mm.
SYSTOLIC PRESSURE	Lying	30	-	30
	Raised	34	5	29
	Standing	85	46	39
DIASTOLIC PRESSURE	Lying	32	-	32
	Raised	45	5	40
	Standing	78	46	32
			Average	33

TABLE VI

Difference between Pressure in Leg and Arm Corrected for Hydrostatic Influence

Table Vb summarizes the corresponding data for the leg pressures. The measurement from the apex of the heart to the popliteal space when standing is subject to the least error of all the measurements. It is consequently of interest to note that the difference between the observed and calculated values for standing pressures is less than two per cent. In contrast, the greatest divergence is noted in the calculation which employs the measurement of the vertical distance between the popliteal space and the estimated level of the abdominal aorta. The average of all the differences between the observed and calculated leg pressures is less than seven per cent.

The necessary data for calculating the ankle pressures according to this method could not be obtained. The facts available, however, show an

From these data, we feel justified in concluding that, in a given part, the changes in blood pressure with change of position are almost entirely due to hydrostatic pressure.

The second phenomenon, the differences between the pressures in arm and leg and leg and ankle which are present in all positions, cannot be explained by hydrostatic pressure. A reanalysis of our data for the same twenty-four cases shows that this difference in blood pressure between arm and leg is constant for all positions after we correct for hydrostatic pressure. In table VI are recorded the observed "leg-arm" differences in the various positions and the differences for the same positions after the correction is applied. The "Hydrostatic Influence" (Column 4) is calculated from the formulae:

(1) (Length raised leg—length raised arm) x 1.05/13.6

(2) (Length standing leg—length standing arm) x 1.05/13.6.

The calculated "leg-arm" difference is determined by adding or subtracting the appropriate hydrostatic factor from the "leg-arm" difference in the lying position.

The average of the values obtained from all observations is thirty-three, which is but slightly divergent from the figures obtained from the original observations in the lying positions. This number is in close agreement with the finding of a thirty-seven millimeter difference between leg and arm by Burdick, who applied his photographic method to four cases.

For the reason mentioned above, we are unable to reëxamine our data for arm-ankle difference in a similar manner. In view of our approximation, which suggests that hydrostatic pressure accounts for all of the observed difference, we would not expect to find a factor similar to the above in this instance.

We have no explanation of this "constant factor" to offer. Attention should be called to the fact that, since the "arm-ankle" differences may be attributed to hydrostatic influences, there must also exist a "leg-ankle" "constant factor" comparable in magnitude to the "leg-arm" factor. Hence any attempted explanation must be adequate for both of these phenomena.

CONCLUSIONS

1. The studies presented indicate that, in the normal person, there are variations in blood pressure in the different parts of the body and, also, that changes of pressure occur in a given part with changes of position.

2. The magnitude of the pressures which the leg arteries must bear is emphasized.

3. The pressure changes in a given limb which accompany a change of position of that limb may be accounted for to a large extent by hydrostatic pressure.

4. There appears to be a definite difference between the blood pressure in the arm and in the leg in all positions. This difference amounts to about thirty per cent. of the arm pressure and is quite independent of hydrostatic pressure.

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SYNDROME—COMPLEX MENIERE*

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IN considering this lesion as a pathological entity, it must be remembered that many conditions which we now know to be capable of inducing identically the same clinical phenomena were practically unrecognized until a comparatively recent date. It is probable, therefore, that many cases have in the past been recorded as true examples of Meniere's disease which have in reality been the result of other conditions, the nature of which would now be easily recognized. The disease is still more or less wrapped in mystery, which immediate investigations will, I think, serve to clear up. There is hardly a week that passes that I am not consulted in regard to seeing a case, already diagnosed as Meniere's disease. The awe with which the referring physician speaks shows an alarm which is again reflected in the patient, the latter at once feeling that he or she has some severe malady the like of which was never before experienced.

Historically, Dr. M. P. Meniere, agrege de la Faculte, medecin de l'institution imperiale des Sourds-Muets, cites the following two cases in the *Gazette Medicale de Paris,* 1861, under the title: "Maladies de L'Oreille Interne Offrant Les Symptoms De La Congestion Cerebrale Apoplectiforme."

M. X., a doctor of 47, noticed noises of variable nature in his ears for about 15 years, especially in the left, in which the hearing was gradually lost in spite of the most energetic treatment. The hearing on the right was likewise enfeebled, although neither had been at any time inflamed or even the site of a

*Contributions from the Evans Memorial, No. 165, A-93.
Read November 9, 1928, Otological Section, New York Academy of Medicine.

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catarrhal lesion. Air had always freely penetrated the middle ear. He often showed symptoms of congestion of the auricle, but only externally. They would become red and warm. The patient alleviated this by simple means, and since 1854 he had given up treatment, hoping that the deafness would remain stationary.

For about three years the disease made no progress until the 26th of last December when, after spending a day in the open, M. X., while reading, was seized with a fit of violent sneezing. On attempting to stand up, he discovered that his gait was unsteady, and that he could not walk in a straight line. Three hours later the symptoms persisted, though the patient had taken a foot bath strong with mustard. He took a light meal and went to bed, hoping that sleep would end the disturbance. He woke at two in the morning, and found walking still more difficult. He had a sense of weight and pressure in the left occipito-mastoid region, and involuntarily turned from right to left. He had fear of falling, as though the left side of the body did not obey his will, while in bed both sides of the body executed freely all voluntary movements. The intelligence was intact, and the patient was able to write at once to one of his colleagues to ask assistance. He came immediately, and while he was about to bleed the arm, the patient was seized with nausea and vomited. The vomiting was repeated often on the following day, and the stomach would retain absolutely nothing. The 28th, 29th, and the following days, under the influence of bleeding, wet cupping and a purgative the difficulty in movement was progressively dissipated, and on the second of January the patient was able to walk, though still with a little uncertainty of gait. Today the general health is perfect, but the hearing has gradually become poorer.

The physician who had observed on himself exactly the succession of phenomena described here thought at first of a cerebral congestion, and two of his colleagues who had seen him during the illness thought with him that the congestion took place in the cerebellum, but it seems to them today more probable that the attacks depend on a lesion of the internal ear.

The second case: M. X., physician, aged 45, short, thin, dark, of nervous constitution and the bilious temperament of Southerners, experienced an attack of intermittent fever in 1858 so severe that he had to use quinine sulphate in large doses. The fever receded, but a ringing in the ears persisted so severe as finally to draw the attention of the patient. He was less concerned with the sequela, the fever having several recurrences, as under analogous circumstances the sounds had promptly disappeared. This time it could not be the same as the sounds persisted as soon as it could be determined that the hearing was diminished. There were some changes in the skin of the external meatus—pruritus and a little exudate—but soon the patient experienced vertigo of a sudden onset followed by vomiting. This sort of cerebral disturbance recurred often after a trip or a sudden variation in temperature. The vertigo with nausea and vomiting was accompanied by muscular weakness and general depression. During the months of January and February, 1859, the patient was confined to bed. The vertigo disappeared during March and until the 25th of August, when it reappeared with such severity that several times M. X. fell suddenly in the street while going to the hospital. The deafness increased rapidly, and with the exception of a slight mucous exudate the ears were healthy. A slight expiratory effort with the nose and mouth closed was sufficient to introduce air into the tympanic cavity.

All the resources of the most vigorous therapeutics were used on this case without success. The hearing is almost gone today. The general health is excellent, the cerebral functions are regular and everything goes to prove that the cause of the phenomena observed is to be found in the internal auditory apparatus.

A little later in the same year Meniere writes again the following observations:

Observation 1: "Forty-two days had elapsed since the appearances of the first cerebral symptoms of which I spoke when, on the sixth of February, having risen in good health—although my head felt a little heavy—I went to see a patient, my cousin. While I changed the dressing of a fracture, I was seized with vertigo, but I was nevertheless able to finish the dressing. I nearly fell, and was given a chair. I experienced eructation and an indescribable illness that the open air did not dispel. I vomited a little coffee, and after an hour of extreme malaise I regained my rooms with much difficulty, leaning on a cane and a stout arm. My gait was tottering, and I noted convulsive movements of my face. The left side exhibited strange feelings and then became paralyzed, though incompletely. The disturbance lasted several days. The pulse was neither full nor rapid and the face was not flushed. There was some vertigo and vomiting for two days, and then all the symptoms disappeared, but it was found that my hearing was worse than before the attack."

This time the patient intentionally refrained from bleeding, but took small doses of aloes and calomel to stir up the intestines, and his health promptly returned.

Observation 2: A manufacturer of X, still young, tall, robust and in the best of health, was giving orders to one of his employees. He was standing in his office, his arms extended, when his employee saw him suddenly stagger and fall to the floor, where he lay motionless as though he had been struck by lightning. He was lifted, all his muscles being completely relaxed. His face was pale and bathed in perspiration. Soon nausea appeared, and then vomiting. Consciousness, lost for a moment, returned, and the patient remarked that everything turned about him, this movement making him sick. He noticed at the same time a great noise in his ears, and these organs which to this time had been excellent, were at once found deaf both by the patient and those about him.

Observation 3: A Paris merchant, 40, small, very robust, large head and large chest, unused powerful muscles, was always seated in his office, scarcely ever going out except by carriage. Last December, without known cause and in perfect health, was taken with the following symptoms: He was stretched in an armchair warming his feet and preparing to roll a cigarette when his wife saw him lean forward and fall on the left arm of the armchair without saying a word or breathing a sigh. Lifted up in a moment his face was seen to be pale and covered with sweat. If his head was released, it fell to the left and resumed its flexed position. Soon nausea followed and then vomiting. He was thought to have had an attack of apoplexy, and the sick man was carried to his bed in a state of complete relaxation. Consciousness returned, but malaise was marked. Everything in the room seemed to rotate, and the patient said he was seasick. He crouched in his bed as if he feared to be turned, and the vomiting continued. Needless to say, free bleeding was done, and resin purgatives given—severe treatment. Little by little the patient quieted and erect posture was possible, though with a little uncertainty in the gait.

Meanwhile the ears had become the seat of violent and continuous noises. Hearing was soon diminished, and the sense which hitherto had been good was lost for conversation in a low voice. M. X., was unable

to go to the theatre as before, and his public and private life underwent considerable change.

Observation 4: Quite recently Dr. Laboulbene, a member of the faculty, called Prof. Trousseau and myself in consultation to see a patient from the South. This man, still young, short, dark and very nervous, had suffered from several attacks of vertigo with nausea and vomiting. The doctors who witnessed the attacks had considered them due to a cerebral congestion, and had combatted them by bleeding, leeches and purgatives, but the repetition of the same symptoms had cast doubt on the diagnosis, and as the patient found that his hearing, hitherto perfect, had diminished, that the ears were full of noise, that the gait was staggering, he came to Paris and we were to establish the integrity of all parts of the auditory apparatus.

The patient, otherwise very well, suddenly experienced something like an arrest of cerebral function. He was walking along the boulevard when he felt faint, everything revolved about him, nausea set in, the face became pale, perspiration stood out on his forehead and he had to lean against a wall to keep himself from falling. These functional troubles only lasted a few minutes.

We had to look up with care all the circumstances which could throw light on the diagnosis of this case, but it was impossible to arrive at anything satisfactory. And as the derangement of hearing was the only appreciable sequela of this cerebral condition, we had only to conclude that the changes which were revealed by these symptoms lay in the internal auditory apparatus.

Meniere then concludes that (1): An auditory apparatus, hitherto apparently sound, may suddenly become the seat of functional troubles consisting of sounds of variable nature, continuous or intermittent, and these noises are soon accompanied by a more or less extensive loss of hearing. (2): These functional troubles having their seat in the internal ear can cause symptoms considered cerebral, such as vertigo, dizziness, uncertain gait, reeling; they are, moreover, accompanied by nausea, vomiting and a state of syncope. (3): These symptoms, intermittent in type, are directly followed by deafness, slight or great, and often the hearing is suddenly and completely lost. (4): Everything points to the belief that the material lesion which causes these functional troubles lies in the semicircular canals.

During this same year he mentions the following case, on which his diagnosis was made and on which, I think, most medical men have since that time become very much confused. To wit:

Of a young girl, who, travelling on a winter's night on a diligence, experienced as a result of a considerable chill, a complete and sudden deafness. Received on the service of M. Chamel, she showed as the chief symptom continual vertigo, the least effort to move producing vomiting. Death occurred on the fifth day. Necropsy showed that the cerebrum, cerebellum and spinal cord were absolutely free from any change. The semicircular canals were filled with a red plastic substance, a sort of sanguinous exudate, of which only a few traces were found in the vestibule, and which did not exist in the cochlea. The most careful investigation enabled me to establish with all the accuracy desired that the semicircular canals were the only parts of the labyrinth that showed an abnormal condition, and that consisted, as I said, in the presence of a reddish plastic lymph.

Now, it would seem that this case today would probably be diagnosed correctly as a form of meningitis, an acute situation, while the other cases cited above might be termed "Syndrome-Complex, Meniere", or the real type, a chronic disease. Thus I suggest that the expression, Meniere's Disease, be changed to Syndrome-Complex, Meniere or Symptom-Complex, Meniere.

The nature of the change in the labyrinth has been necessarily a matter of conjecture. Politzer mentions that cases have died after presenting all the clinical features of the disease in which the post-mortem findings have failed to provide any evidence of haemorrhage into the canals, and, on the other hand, an haemorrhagic exudate within the vestibule and canals has more than once been observed post-mortem in cases where no history of typical symptoms during life could be obtained. Furthermore, this lone case, upon which our conception of the disease still very largely rests, does not supply a logically complete picture, for one of the conspicuous clinical features of the attack was the sudden and profound deafness, yet his post-mortem examination revealed no abnormality within the cochlea.

Anatomically, the labyrinth is a closed cavity. Within this bony structure is a membranous labyrinth, a menbrane so extremely sensitive to any form of direct mechanical injury that it is difficult to believe that a considerable exudate of any sort could fill even a portion of this cavity without causing practical destruction, or at least permanent ablation of function of the membranous structures contained therein. It is one of the inconsistencies of our conception of the disease that while the semicircular canals are looked upon as the characteristic site of the lesion, permanent deafness is said in severe cases to be one of the most constant and characteristic sequelae.

Stimulation or irritation up to destruction of the labyrinth or any portion of the vestibular tracts induces vertigo or confusion with the associated loss of equilibrium. Therefore, in diseases of all these regions vertigo is to be expected by at least implication of the vestibular nerve. Thus the character of the accompanying phenomena especially the nystagmus aids in the localization. This does not mean that irritation of the ear itself is the sole and only way of producing vertigo. We all realize that various visual disturbances, cardio-vascular affections, gastric or alimentary disorders may exhibit dizziness as a symptom. However, in the latter instances it is the direct action on the vestibular apparatus that is responsible for the induction of the vertigo. The stomach of itself, or any of the other organs, excepting the labyrinths, can no more produce vertigo than they

can produce sensations of flashes of light or obsessions of smell.

The symptoms of irritation vary according to the intensity of the affection. These usually appear in paroxysms at irregular intervals. In the intervals which may be weeks or months the patients are either free from all disturbances of equilibrium, or there are sensations of dizziness and unsteadiness of gait which may be more or less marked, and which do not disappear entirely. The attacks return either without any apparent cause, or from bodily exertion, rapid turning of the head, bending or rising suddenly after a hearty meal, as well as after nervous excitement. A fresh attack is often preceded by increased tinnitus, a feeling of pressure and heaviness in the head, uneasiness, general depression and a sensation of rotation. The attack itself is, according to its intensity, characterized by severe dizziness, tinnitus and nausea, often accompanied by vomiting. When the patient endeavors to walk or stand, there is a tendency to fall forwards, generally to the affected side. Even when quiet in bed with the eyes closed, the individual may have the sensation as if the entire room was revolving. Every attempt to change the position of the body or to rise increases the intensity of the attack.

Of the violent symptoms met at the beginning of the attack, the transitory unconsciousness and vomiting are the first to disappear, while the dizziness and disturbance of equilibrium as a rule diminish only in the course of several days to such an extent that the patient is able to walk a short distance either with support or the aid of a cane. It is usually noticed that, when the patient walks, there is a tendency to fall forward, reaching for some indefinite object just out of reach. The disturbances of equilibrium experienced in the dark, and while walking with closed eyes, are especially noticeable, inasmuch as even in those cases in which the affection is of a mild degree, the unsteadiness of gait may be as pronounced as that met with in the most severe forms of ataxia. In addition to the above, it is found that in the first few weeks of the severer forms of deafness, psychical depression, slow cerebration and weakness of memory develop.

On close inspection of the patient it is noticed that the individual is usually of middle age, that the face is pale and bathed in cold sweat, while the subjective symptoms complained of are usually a bilateral, more rarely a unilateral, deafness accompanied by severe tinnitus. The pulse is slow, the temperature may be subnormal and the nystagmus is a combination of horizontal and rotary. The vestibular nystagmus usually increases when the eyes are directed in the direction of the quick movement, and diminishes or ceases altogether on causing the patient to focus in the opposite direction. The deafness may be of long standing or come on suddenly with the first attack. The loss of hearing usually remains stationary; it is only in exceptional cases that a slight improvement is observed. This may be permanent or again become lost in spite of active treatment.

Believing as we do that a definite percentage of these cases have an endocrine diathesis it is my desire to cite the following cases with an appropriate discussion regarding their outcome and suggestions as to therapeusis.

Case 1—Married man, 56 years old: successful merchant: chief complaints, tinnitus, vertigo, nausea and vomiting with slight deafness. During the past ten days he had five attacks, more or less severe in character; describing his sensations he stated that as soon as he was able to sense his surroundings, objects in the room seemed to rotate to the right that the window case, instead of moving directly to the right, moved with a wavy, dipping motion. That it seemed difficult to focus the eyes to near objects as well as experiencing trouble in focusing on distant points. He had been extremely tired, sleepy and stupid, even after a full night's sleep. There had been no hiccup but considerable gas in the bowels. The intestines had been sluggish with some headache in the occipital region. There was a tendency to yawn throughout the entire time consumed in questioning and examining. He had a similar series of attacks seven years ago. The patient's family history showed heart failure, arthritis, one remote case of malignancy, several of gall stones and apparently a very definite longevity. The patient recorded the minor ailments of childhood, diphtheria at 17, and a ruptured appendix 5 years ago. At times had experienced pain in the region of the heart. Takes an occasional liver pill on suspicion. Residual history not remarkable.

The physical examination showed good development and nourishment, hair sparse, heart and lungs negative, residual examination was substantially negative regarding the present condition. The urine was entirely normal except for the residual nitrogen fraction which was high, a general indication of disturbed metabolism. Blood morphology showed a slight eosinophilia and a slightly high value for the endothelial leucocytes. The blood chemistry was normal. Serologicals were negative. Phthalein was normal. The sugar tolerance was depressed. The patient was 19% overweight and with a fairly normal lung capacity. Basal rate was recorded as —18% with a slightly slow pulse. The audiogram showed a marked loss of hearing in the right ear, most noticeable in the lower frequencies. The Barany showed a slightly depressed reaction time, was otherwise quite normal as was the caloric test. The neurological examination showed that the reflexes were normal. Co-ördination was remarkably good for the lower extremities in the heel to knee, and heel along tibia. The upper extremities extended without tremor, there was no pass pointing of finger to finger or finger to nose. Extended hands were rotated evenly and at the same level. The cranial nerves were intact as tested; there were no parathesias or anesthesias. The stations were correct with eyes closed and opened. X-ray showed a large sella with a doubtful thinning of the posterior wall,—not a real evidence of pathology—with an unerupted third molar and a retained root. The endermal tests were negative. Eye examination showed somewhat enlarged blind spots and a slight field contraction. A Graham test by the oral route showed a pathological gall bladder.

Diagnosis: Thyroid failure, possible liver complications.

Comment: This case showed physically a tangible gall bladder pathology, and as the x-ray made this seem likely, we have a sound explanation for

the lowered sugar tolerance through the associated disturbed liver function. As a result of hypofunction of the thyroid, the assimilation limits for galactose are either normal or else raised above that which is essential to a normal metabolism. As a result of this lowered metabolism and temperature there arise the subjective symptoms of chilliness, cold extremities, and a desire for warmer or heavier clothing. In reality this instability may be due to the fact that at times the functioning of the thyroid gland is excessive, again it is deficient in the same individual. The eosinophilia may be due to the intestinal disturbance. In addition the lymphoid blood, depressed blood pressure and pulse rate, together with the high residual nitrogen determine the diagnosis of thyroid disease. The treatment instituted was thyroid extract, two grains daily and increased in two weeks to three grains daily with the meals. The subsequent notes showed that the basal rate returned to normal, the blood pressure remaining between 124/84 to 130/80; pulse, temperature and weight improving, the only thing complained of was the fatigability. He was troubled with insomnia at times but this was probably due to the pressure of his business as it was very demanding. It is now over two years that he has been under intermittent observation, taking four grains of thyroid daily and without any return of the vertigo, is free from all tinnitus and his hearing considerably improved.

Case 2—Married man, 52 years old and for years had worked in a quarry. His chief complaints were violent vertigo, falling to the ground, deafness, tinnitus (throbbing type), nausea and vomiting. During the last year the periods of vertigo, their onset apparently independent of eating would incapacitate him, as on walking, either in the house or outdoors, especially if in the dark, he would fall prone, or if able to protect himself by a chair he would then gradually clear mentally, but on any quick change of position the vertigo and nausea would again make themselves felt. The description of the vertigo was generally of a mixed type and he was unable to determine the direction of objects, but was sure that either closing or opening the eyes made no difference in the confusion. Outside of general nervous tendencies the family history was negative, while the personal history showed malaria in his younger days as well as mumps and measles. He smoked a great deal and formerly used alcohol excessively. Had two living children who were well.

The physical examination showed a symmetrically developed man with a general loss of weight, color pale and the muscles seemed to be very rigid. The eyes reacted to light sluggishly but the pupils were equal. Ears showed advanced adhesive processes in both middle ears. The static labyrinth showed a normal reaction time and the caloric test was normal. The urine showed a slightly depressed amount for twenty-four hours with albumin but no casts. The blood showed nothing remarkable either morphologically or chemically. The serologicals were negative, as was the result of a spinal puncture. The phthalein is normal. X-ray showed fibrosis of the lungs and pyorrhoea about all the remaining teeth. The gastro-intestinal examination showed no pathology. The neurological examination was entirely negative except the loss of the knee jerk on the left. The eye grounds were negative as were the fields of vision. The basal rate was within the normal range (slightly raised) with a subnormal temperature and pulse rate. The blood pressure showed 142/84.

Diagnosis: A disturbance of the central nervous system (toxic) without any demonstrable endocrine involvement.

Comment: Treatment in this case consisted of extraction of all the teeth in both jaws, a change of occupation together with supportive, outdoor treatment. This man improved very much indeed so that six months following the first observation although the deafness and tinnitus had not improved the vertigo and nausea were absent and the dark did not trouble his locomotion. He had, however, an early interstitial nephritis which is slowly progressive. He has been free from the peculiar somnolent attacks following the severer attacks of the vertigo that he experienced two years ago. The greatest diversity of symptoms, seemingly unrelated and not referable to any common cause, are encountered in all hypofunctional disturbances even when a diagnosis of a specific gland involvement cannot be made, thus a non-endocrine diagnosis is in order. This case was probably of toxic origin.

Case 3—A married man, 68 years old, retired from business, complained of marked sinking, dizzy attacks, headache (parietal and temporal), tinnitus, nausea and vomiting. During the past eight years had had several attacks but during the last two winters the attacks have been very bothersome due to their frequency. Before the attack, tinnitus increased in both ears until he seemed to hear nothing but the roaring, then he became confused and lay down. Several times on not lying down at once he had fallen. Objects seemed to rotate in several directions and it made no difference to the sensation whether the eyes were open or closed. The vertigo was apparently relieved after vomiting a number of times, but the depression and lassitude left as residue were very distressing. He also suffered intensely from seasickness. There were several cases of mental disturbance in the family history which is otherwise negative. There was also a personal history of long standing constipation and a watery nasal discharge for several years. In addition to the minor ailments of childhood the patient had scarlet fever, two operations for hemorrhoids, repeated probing of the right lacrimal duct many years ago. Had also pain in the high cervical region when doing hard physical labor.

The physical findings showed oedema under both eyes, with numerous red naevi on the body. The occipital region showed a slight depression but was negative to the x-ray. The routine examination of the urine showed fair elimination with poor balance. One sample showed albumen but no casts were found. There was a normal nitrogen partition. Phthalein low normal. The galactose tolerance was normal with a normal shaped urea curve and a normal salol reaction. The blood showed a 3% eosinophilia in a slightly lymphoid blood while chemically there was an increase in non-protein nitrogen and uric acid. The serologicals were negative. The basal rate initially was —13%—a value above the truth—with definitely slow pulse and low blood pressure and slightly low temperature. The alveolar carbon dioxide was normal, the patient was 9% underweight. The barany, while showing normal reaction time, elicited the same vertigo as the patient experienced before entering the hospital for study. The x-ray studies, endermal tests and eye examinations were all negative.

Diagnosis: Hypothyroidism, (mild).

Comment: He had a high blood uric acid, but this loses much of its significance when it is associated with an increased non-protein nitrogen which he showed in his blood repeatedly. The lowered basal metabolism would equally be referable to the patient's obviously low nutritional level, but with him this was not the case as repeated tests at two-week intervals gave levels of the metabolic rate distinctly lower than the first one reported. His 3% eosinophilia might arise from several conditions, but with him, we think, it was due to faulty intestinal action. The action of the thyroid in affecting the general metabolism of the body explains the diversity of symptoms arising from its lowered activity. Constitutional tendencies may be made manifest in the

general systemic disturbance resulting from glandular failure. Moreover, it has been demonstrated that the single gland may manifest overactivities and underactivities at different stadia of its functional derangement. Dysfunctional types are also recognized, in which the complex function of the gland may integrate diverse activities of its several functional components. Lastly, hypofunction is sometimes described as general debility and is intimately related to the infections, both acute and chronic, to the lowered vitality following prolonged nervous and emotional strain, and as stated above, to constitutionally lowered vitality.

As to treatment for this individual, he steadily improved under two grains of thyroid daily with his meals. However, he found that he could not omit the food from his diet without slipping into the former distressing symptoms.

Case 4—Lady of means, a widow, 60 years of age, had quite constantly for the past three years or more attacks of vertigo associated with a very unsteady gait. The use of a cane had been of no great help, as she exhibited a tendency to go to the right. She had fallen in the house but never outdoors. She had marked loss of hearing during the past five years. During several of the dizzy attacks she had tired herself out by vomiting. For the past few years had frequent attacks of herpes and for the past year had been very constipated. She also complained of great fatigability with the least mental or physical effort.

The physical examination noted a dry skin with several small brown spots scattered over the body. Her reflexes were active but the gait was unsteady and sense of accommodation and locomotion were poor. The cranial nerves seemed, however, to be normal for a woman of her age. The urine showed fair balance with a high residual nitrogen. The blood was lymphoid in character with a slight depression of erythrocytes. There was a loss of vital capacity while the basal rate was —31%, with a lowered pulse rate and a lowered blood pressure and temperature. The serologicals were negative; the phthalein totaled 53%.

Diagnosis: Hypothyroidism.

Comment: While all of the points presenting are not strictly in accord with the classical picture, the fatigability, constipation, hypothermia, high residual nitrogen, lymphoid blood and lowered basal rate leave but little question of a correct diagnosis. It is rare, however, that all the symptoms and laboratory findings are present in any one individual. Fatigue, disinclination for mental and physical work, particularly in the morning, are characteristic. The subject of hypofunction is never fit, he or she finds work a burden, and whether the employment is physical or mental, a push is required before the task is consummated. General nervousness and irritability are common symptoms, while constipation is very usual, due to deficient muscular movements of the bowels. The case was treated with three grains of thyroid daily for several weeks. The vertigo ceased but as she remained unsteady in her gait the thyroid was increased to five grains daily. This helped her basal rate bringing it up to —23% but otherwise she was not feeling as well as she thought she ought. The thyroid was omitted and thyroxin 1/320 gr, twice daily, was used. This seemed to make her better and stronger, allowing her to walk about her place without any aid. The appetite was improved. The thyroxin was increased to three tablets daily and now she is feeling very well, head clear, no vertigo, and can do as she pleases.

In commenting on the outstanding symptoms of the above series it is suggested that the giddiness is caused by the stimulation of the nerve fibres rather than a diminution of their function. The tinnitus seems to be heard in both ears, but is almost always louder in one than in the other. It has been observed that the perception of musical notes is faulty in many of these cases. In the severer form nausea and vomiting follow the vertigo, and the pallor and physical depression are marked. Movements of the head seem to increase the confusion. After the attack the patient suffers for a few days from slight persistent vertigo. The tinnitus may or may not be increased by the paroxysms of vertigo. The attacks are sometimes accompanied by ocular disturbances, such as double vision, jerky movements of objects, and distinct erroneous projection in the direction of the movement, so that if the patient attempts to touch an object the hand goes too far in the direction of that object.

The attacks frequently come on suddenly, so much so that habitual sufferers are afraid to go upon the street alone. They are paroxysmal, and may occur daily or at much longer intervals, vague sensations are observed in the intervening period. These paroxysms may come on spontaneously or be induced by some sudden movement or passing excitement. In the worst cases unusual intellectual effort may determine the attack. They may continue until the impairment reaches complete deafness, when there is usually a cessation of all confusion.

In partial or circumscribed disturbance of the vestibular end-organs in the labyrinth the vertigo is associated with nystagmus. The nystagmus is spontaneous and shows a long slow movement, due to the vestibule, and a quick return movement due to the tegmental nuclei, the direction of the quick movement naming the nystagmus. If the nystagmus movement is rotary and horizontal it must be determined whether it is peripheral or central. A peripheral nystagmus to the right should show on caloric, pressure and rotation tests that the right vestibule is functionally active. Should such tests show an inactive right vestibule, then the nystagmus must be of central origin, if the right vestibule is active, then continued observations of the nystagmus will alone determine. Should the nystagmus continue uninterruptedly for twenty-four hours or more, it is of functional origin. If it lasts a shorter interval and is interrupted by quiet intervals, it may be either peripheral or central. When there is also nystagmus of the well side, which lasts about two weeks, gradually decreasing, then a peripheral disturbance seems certain, as intracranial nystagmus is not so apt to diminish.

In a careful study of over five hundred consecutive cases that on laboratory examination were shown to be frankly endocrine in origin, and considering only the three dominant symptoms of the syndrome, namely, deafness, tinnitus and vertigo, I found these symptoms as not only present but rather the chief symptoms of complaint, in 289 pituitary, 148 thyroid

cases and 119 gonad cases as well as in 12 cases of adrenal involvement. This might be shown in the following table:

TABLE I

OBSERVATIONS IN AN ENDOCRINE GROUP

	No.	Deafness	Tinnitus	Vertigo
Pituitary	289	22%	36%	24%
Thyroid	148	18%	34%	15%
Gonad	119	13%	34%	22%
Adrenal	12	25%	16%	33%

In another group study of a similar consecutive series of 500 cases reports, shown to have a definite non-endocrine etiology, similar data are given in detail in the following table. The miscellaneous column is composed of cases showing types of disease involving the blood, bones, gastro-intestinal tract, respiratory system, eye, ear, etc.

TABLE II

OBSERVATIONS IN NON-ENDOCRINE GROUP

Diagnostic Group	No.	Deafness	Tinnitus	Vertigo
Cardiovascular	61	24%	19%	40%
Neuroses and Psychoses	60	16%	11%	45%
Syphilis	43	18%	18%	32%
Focal Infections	56	28%	18%	23%
Lesions of the Central Nervous System	82	22%	13%	37%
Miscellaneous	198	39%	20%	22%

SUMMARY

I do not wish to convey the idea that all cases of this interesting syndrome are endocrine in origin or that I have a panacea as to treatment, but I do feel that by no means all of these cases are surgical and that when by close laboratory and clinical study an endocrine diagnosis is established it will be found to be hypofunctional in character and never hyperfunctional. Again, I would like to point out that it is apparently the nutritional level of the individual that determines an increase or decrease of the presenting symptoms in this syndrome, especially in those cases of endocrine origin.

CONCLUSIONS

1. As with every disorder depending upon an organic lesion the severity of the symptoms varies with the extent and character of the lesion.

2. That attacks of labyrinthine vertigo are caused either by increased or decreased intralabyrinthine pressure.

3. That the syndrome-complex may occur in patients whose ears are already affected with deafness not of nerve origin at the beginning, and that the onset of deafness, on the other hand, may originate with the first labyrinthine attack.

4. That the autopsied case described by Meniere was an acute infection, probably meningeal in origin, while the cases of the syndrome-complex are always chronic in character and are directly of ear origin.

OPERATIVE LENGTHENING OF THE FEMUR WITH REPORT OF TWO CASES*

BY HENRY W. LAMB, M.D.†

LENGTHENING the bones of the lower extremity by operative means is not a new procedure, though as yet it has not been used extensively. It is a most constructive operation, since its aim is the restoration of the normal length of the affected limb.

There are three chief causes for a shortened lower extremity:

(1) Anterior poliomyelitis, with resultant retardation of growth of the limb.

(2) Badly reduced fractures, with union between over-riding or angulated fragments.

(3) Injuries to the epiphysis, with disturbance of growth.

Of these, the two last named are the most satisfactory to treat because of the integrity of the soft tissue structures. However, in cases of paralysis, the increase in length obtained is of great importance in bringing about efficient locomotion.

Soft tissues are easily extendible, and it is this fact which makes possible the lengthening of these structures by traction forces. The chief consideration is, to what extent the inherent extendibility of the soft structures may be depended upon, for it is this quality which determines the ultimate degree of lengthening obtainable. The amount of stretching can and should be controlled, as the more slowly and constantly the traction forces work, the more easily the tissues yield, and less structural damage results.

The most satisfactory pull is obtained by skeletal traction, which is easily and effectively applied by means of either the calipers, or a Steinmann pin.

Putti designed an instrument known as an "osteotone," constructed in the following manner: It is a telescoping tube in which is a strong metal spring pressed by a screw. This tube is fitted by two metal sockets to the projecting ends of two large metal pins fixed in the proxi-

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†For record and address of author see "This Week's Issue," page 202.

mal and distal portions of the bone before division takes place. A double indicator designates both the distance and the amount of force applied. This apparatus is removed in 30 days and a plaster-of-Paris spica applied.

Leroy Abbott devised a similar instrument consisting of two steel drills, two extension pieces, two stabilizers, and a Thomas splint with an adjustable foot piece. The drills are turned through the bone and left in place for attachment to the extension pieces, which afford traction on both sides of the leg. The individual pin to which these extension pieces are

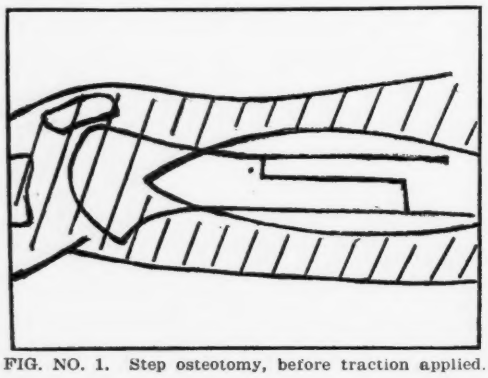


FIG. NO. 1. Step osteotomy, before traction applied.

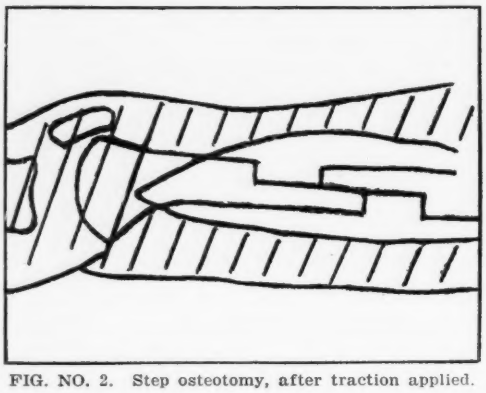


FIG. NO. 2. Step osteotomy, after traction applied.

fastened can be moved up or down as desired, by means of a turn-buckle. After division of the bone, seven to ten days is allowed to elapse before any attempt is made to lengthen the leg.

Neither of these instruments seems to offer any advantages over the application of simple traction forces to the lower fragment only. With calipers and simple traction the amount of pull can be easily regulated, and there is no complicated apparatus requiring constant adjustment. Of greater importance is the fact that with simple traction, no mechanical appliance is placed in contact with the operative wound, which trauma has made particularly susceptible to infection. The careful application of the calipers, or other similar apparatus, precludes any but the minimal amount of trauma.

There is always absorption about any foreign substance placed in bone. With the osteotone or with Abbott's apparatus a very considerable pressure is exerted directly on the bone near the site of division, where absorption is far from desirable. By using calipers or a Steinmann pin applied just above the condyles of the femur, absorption takes place away from the area of bone division.

CASE NO. 1.

R. T., aged 7, male, admitted January 22, 1927.

Complaint—Left leg shorter than right; limp.

P. H.—Patient always well except for infantile paralysis two years previous to admission. Good recovery except for partial residual paralysis of left leg. One year previous to admission the child fell from a porch sustaining a fracture of the left femur, which was treated at home by traction.

P. I.—Since his injury the patient has limped and the left leg has been noticeably shorter than the right.

CASE NO. 1, A. A-P view, before operation.

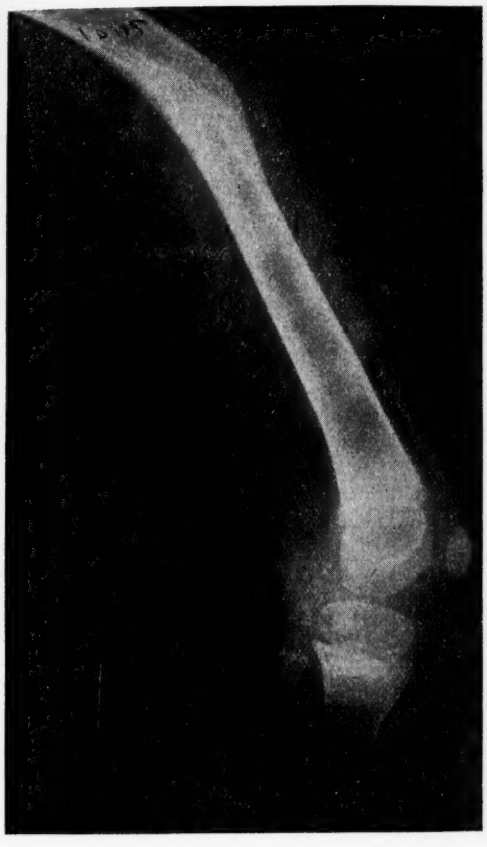
P. E.—The patient is a well developed and nourished white child. Examination reveals him to be quite normal in all respects, except for the left thigh and lower leg. The left leg is 1¼ inches shorter than the right, this shortening being confined, for the most part, to the femur. All flexors and extensors of thigh and leg partially paralyzed. Circumference of entire left leg less than right. Reflexes of left leg diminished. Unparalyzed portions of muscles functioning well. Patient walks with decided limp.

Diagnosis—Old fracture left femur, mal-union.
Old infantile paralysis, involving left thigh and lower leg.

X-ray—Old fracture left femur, midshaft with considerable overriding and some anterior angulation.

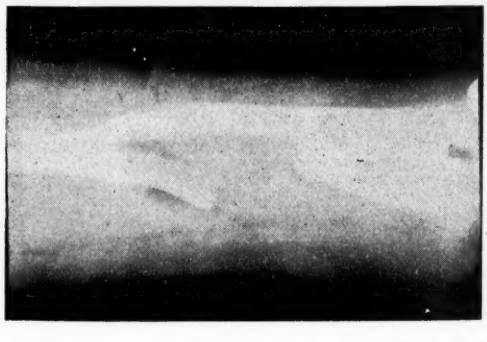
Operation, January 26. 7% Iodine preparation. Longitudinal incision along outer aspect left thigh, 29 cm. in length. Fascia divided, muscle separated by blunt dissection. Site of old fracture exposed for about 10 cm. Osteotomy by the step method. Entire wound wiped out with 7% iodine. Fascia closed with No. 2 catgut interrupted sutures. Skin closed with interrupted silk worm gut cyanide dress-

ing 1-5000. Through puncture wounds just above condyles of femur, calipers placed, and 8 lb. traction applied, with necessary counter-traction.
X-ray, Jan. 27—Osteotomy left femur, with slight separation of fragments, position good.



CASE NO. 1, B. Lat. view, before operation

Jan. 29—2 lbs. weight added to traction apparatus.
Feb. 1—2 lbs. weight added.
Feb. 5—2 lbs. weight added to traction. Measured gain in length 1 inch.



CASE NO. 1, C. A-P view, after operation, showing lengthening obtained.

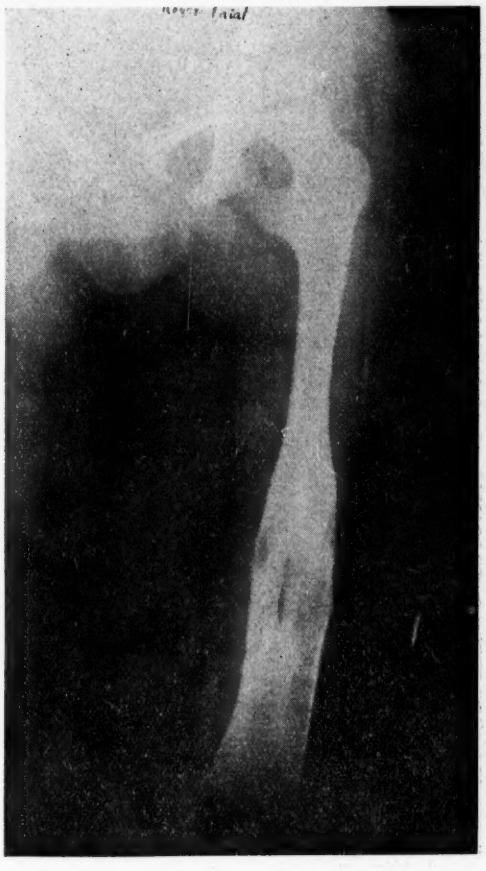
Feb. 8—2 lbs. weight added. X-ray shows fragments in good position. Separation of fragments estimated in x-ray, 1 inch.
Feb. 12—2 lbs. weight added. Measured lengthening obtained, 1¼ inches.
Feb. 15—Stitches removed. Temperature, pulse, and respirations normal.

The traction force of 18 lbs. was kept constant until March 1, when x-ray revealed good callus formation, and union was solid. On this day the calipers were removed and a plaster spica applied, incorporating the foot. Measured length of left leg equal to right.

March 29, eight weeks after operation, cast bivalved. Massage and passive motion to thigh and knee. Incision and caliper wounds healed. Union solid.

April 12, ten weeks after operation, cast removed. Active motion and walking started. Motion of knee limited to 20 degrees flexion. Measured length of both legs the same. Massage and passive motion daily.

May 1, fourteen weeks post-operative, patient up and about all day. Walks well with only a very slight limp. Flexion of knee to 45 degrees.



CASE NO. 1, D. A-P view, after operation, showing end result.

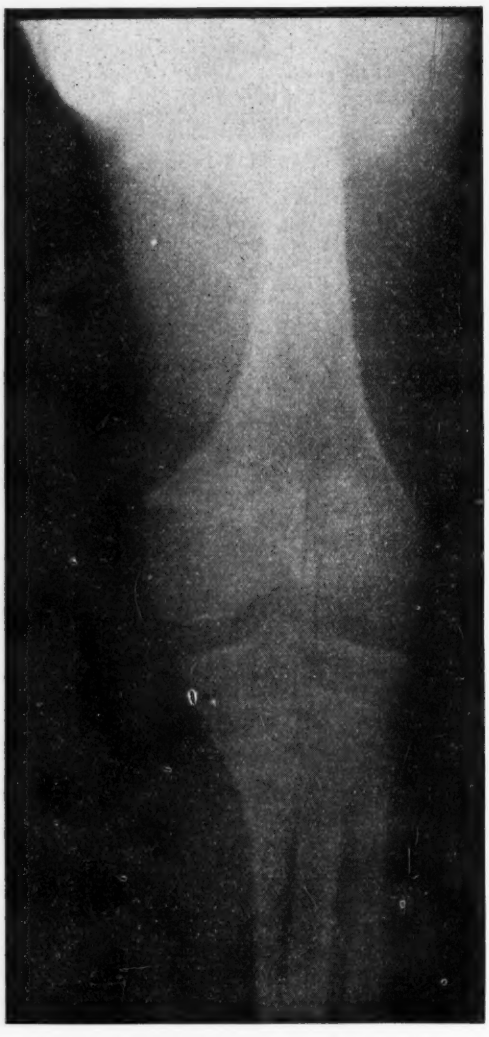
May 18, sixteen weeks after operation, flexion of knee to 90 degrees. Union solid. Walks well with slight limp. X-ray shows healed osteotomy of left femur, excellent position, large callus formation.

June 7, patient discharged, 19 weeks after admission. 110 degrees flexion of knee without pain.

CASE NO. 2.

W. P., aged 12, male, admitted June 25, 1928.
Complaint: Left leg shorter than right, limps.
F. H.—Father, mother and 5 siblings living and well.
P. H.—Usual childhood diseases. General health good.
P. I.—5 years previous to admission, patient injured the left leg by twisting it in a wagon wheel. This injury was treated by the application of a plaster cast. No further history of the injury obtainable.
P. E.—The patient is a well developed and nourished white child. Examination reveals a normal child of 12 years, with the exception of the left leg. Examination of the left leg shows a marked enlargement of the lower femoral epiphysis but no interference with motion of the knee joint and no muscle atrophy. Measured shortening 1¾ inches. Motion of hip and ankle joints normal.

Diagnosis:—Retarded growth of left femur, due to old injury of lower femoral epiphysis.
X-ray:—Enlargement of lower femoral epiphysis. No evidence of fracture.
Operation:—June 27, 1928. 7% iodine preparation, longitudinal incision on outer aspect of left thigh. Muscle separated by blunt dissection. Mid shaft of femur exposed for about 10 cm. Osteotomy of the femur by the step method. Muscle and fascia closed with interrupted catgut sutures. Skin closed with interrupted silk-worm gut sutures. Cyanide dressing. Through puncture wounds, calipers applied to left femur, just above condyles. Thomas splint ap-



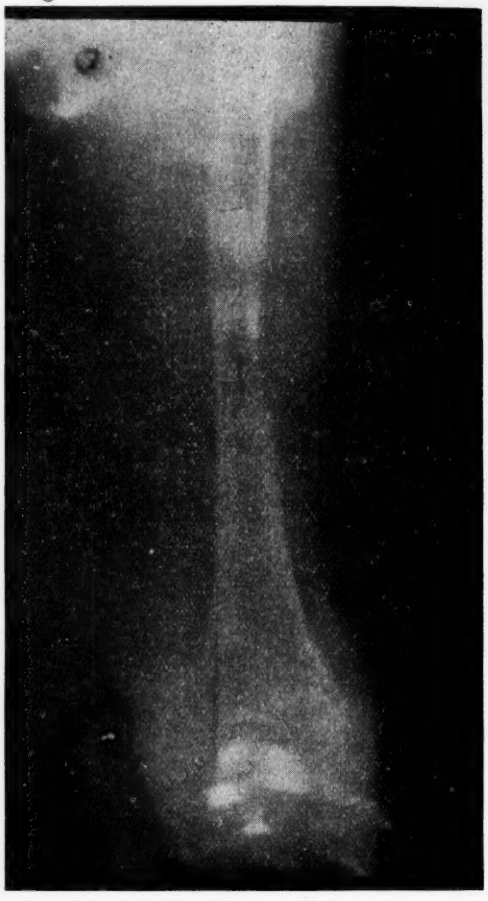
CASE NO. 2, A. A-P view, before operation.

plied, with 12 lbs. traction weight and necessary counter traction.
X-ray, June 28, showed "step" osteotomy of left femur, with fragments in excellent position.

From July 3 to July 21 three lb. weights were added daily until the measured gain in length was 1 5/8 inches. The total of 48 lbs. was kept constant until Aug. 14, at which time the measured shortening was only 1/8 inch. Wound healed. X-ray showed lengthening of femur, with good callus formation. From Aug. 15 to Aug. 30 weight was removed from the caliper at the rate of 3 lbs. per day. At the end of that period, or 9 weeks after operation, the calipers were removed. Plaster spica applied from toes to costal margin, with windows over caliper wounds for dressings. Patient up and about on crutches.

Sept. 14—Plaster spica removed, caliper wounds healed, union of femur solid, range of motion of left knee 60 degrees. Baking, massage, passive and active motion started.

Sept. 25, 12 weeks after operation, the patient was discharged to the out-patient department, the wounds entirely healed, and the measured shortening only 1/8 of an inch. 110 degrees motion of knee.



CASE NO. 2, B. A-P view, after operation, showing lengthening obtained.

Normal motion of hip and ankle. Walking without crutches, with but a slight limp.

SUMMARY

1) Lengthening of the femur by operative means is a practicable and valuable procedure.

2) Lengthening is obtained by means of simple skeletal traction with calipers or Steinmann pin after a "step" osteotomy of the femur.

3) Two cases are reported. In the one, lengthening of 1 1/4 inches was obtained, and in the other 1 5/8 inches.

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VERMONT STATE MEDICAL SOCIETY

MEDICINE'S SEARCH FOR THE FUNDAMENTAL CAUSES OF DISEASE*

BY S. S. EDDY, M.D.†

THE determination of the cause of diseased conditions is the fundamental basis of the physician's service to his people. Toward the diagnosis of what ails the patient is directed the physician's investigation of the case and upon this diagnosis is based the outline of the treatment and the prognosis both as to the progress of the case and the chances of recovery.

The value of the physician in the truest sense is measured by his ability, through his knowledge of medical science, through his skill in obtaining the history of the case and from his judgment in weighing the information obtained, to form a correct opinion as to the cause of the patient's ailment. So at once it is the duty of the physician to search in every case for the underlying fundamental causes of disease.

The history of medicine itself has been the history of the search after the cause of disease. The beginning of medicine was made when man first asked himself why there should be disease and death and what can be done to escape them.

To the gods was early attributed the cause for all that came of good or evil, and so to the gods was attributed the responsibility for disease.

Surrounded by mysteries everywhere, primitive man peopled heaven and earth with Powers and sought to appease these Powers by sacrifice and prayer, and thus to alleviate sufferings.

The idea that the spirits of evil were susceptible to this sort of influence led to measures which were indeed crude and weird with the purpose to charm away the evil spirits or again vile and frightful in an attempt to scare them off.

The belief that the gods paid heed to this form of approach led to the belief that they could be appealed to work vengeance on another, and thus diseases and sickness were often thought to be due to the desires of one's enemies.

The early Greeks and Romans added dignity to gods supposed to have control of health and to them reared temples which gradually began to assume the character of sanatoria, at which were gathered accumulated records of symptoms of diseases and measures thought to give relief, having both a religious atmosphere and serving as a place to rest and offer prayer. While some excellent accounts of many diseases were given by early Greek physicians, of the actual causes of diseases they knew little or nothing and the truths they presented "were obscured in a cloud of theory."

With the era of Hippocrates, 460 B. C., was introduced the humoral theory of pathology; that in man there are four elements, blood, mucus, yellow bile and black bile, of which the blood represents the heat, mucus the cold, yellow bile the dryness and black bile the moisture. Health consisted in the proper admixture of these humors, diseases in the improper mixture.

This humoral pathology of the school of Hippocrates dominated the profession for more than 2,000 years.

The opinion of Democrites, who was a contemporary of Hippocrates and who was considered one of the greatest of Greek minds attributes the great epidemics to the destruction of the celestial bodies and the fall of the atoms comprising them, the latter being the enemies of human nature.

The Dark Ages left a gap in the advance of medicine, the theories of Hippocrates and Galen holding sway with retrogression rather than advance for twelve centuries. From then on the advance in the study of anatomy, physiology, pathology and clinical medicine led gradually to the belief in a specific cause for each disease, although of a real knowledge of the actual scientific causes of disease the world possessed practically none until the middle of the last century.

Nevertheless for a century or two before that time men had been searching for the "seats and causes of diseases" and the fact that fevers were catching and that contagion could be carried from one person to another led to the belief in the minds of many that the actual cause was something alive.

Cracastorius, a physician in the 16th century, spoke of the seeds of contagion passing from one person to another and compared the processes of contagion and fermentation of wine.

With the introduction of the microscope man began to see under its magnifying power minute forms of life in water. And yet the nature of these forms of life was not understood but was thought to be "the concomitance of putrescence and not its essential cause." They were believed to be of spontaneous generation rather than the result of life from life.

The dawn of the knowledge of the true etiology came with Pasteur's discovery of the germ theory of disease. Here modern medicine began.

*Presidential address delivered at the Annual Meeting of the Vermont State Medical Society, Burlington, October 11, 1928.

†For record and address of author see "This Week's Issue," page 202.

Leading up to Pasteur's work on the cause of fermentation and disease, Virchow, in 1853, had formulated the doctrine of cellular pathology and on the basis of cellular pathology it became possible to formulate reasonably correct conceptions of what disease does in the body.

But what a flood of light was thrown on etiology by the discoveries of Pasteur. Before him, cloud and darkness. From then on a revelation of light and truth ever growing brighter until it has shown the cause of nearly every infectious disease,—only a few excepted. All this within the memory of many now living.

Wonderful and dramatic has been the unfolding of the germ causation of disease during the past half century. We have passed from the candle light of medical history into the Great White Way Illumination of today.

The story of the discovery of many of these infectious diseases presents some of the most interesting romances in the history of the world. And in their devotion to the study of etiological causes that their fellow-beings might be benefitted many have paid the supreme sacrifice. We honor the names of such men as Reed, Lazear, Agrinaldo, McClintie, and Noguchi.

Following Pasteur's vision Koch introduced laboratory methods of culturing and staining which made possible the isolation of organisms.

Beginning with the discovery of the anthrax bacillus by Koch in 1874, onward, there followed the amazing series of discoveries which have made famous the times in which we live. The discovery of the bacillus of leprosy by Hansen,—the bacillus of relapsing fever by Obermier, of tuberculosis and cholera by Koch, of the gonococcus by Neisser, the bacillus of diphtheria by Klebs Loeffler, of typhoid by Eberth, and of tetanus by Nicholaier, all came within the next ten years. From then on one after another of the life histories of the causes of the different diseases has been unfolded until few withhold their secret from the world.

With the bacteria causing diseases came the story of the disease-producing parasites—of ringworm, of malaria and sleeping sickness. That the mosquito, the fly and other insects often are a factor in the cause and transmission of diseases was also made known.

Of the diseases due to specific infection but a small proportion yet remain uncharted as to their etiology. And it is a reasonable prophecy that the remaining few will have their cause determined within the next few years.

To be able to say that of all the diseases of directly infectious origin the germ causation is known and understood will be a wonderful achievement for the medical and scientific world, yet this is only a part of the burden of medicine in the unfolding of etiology; medicine is aware indeed of work before it, of fields rarely entered, of others only touched. In much we are far from reaching the ultimate in the causation of disease conditions as related to the health of man. Even in the diseases of infectious origin we are obliged to consider not only the germ but also man's susceptibility to and his power of resistance against it. The studies in the field of immunity have shed much light on this subject, but this light serves but the better to show us how much there is yet to be learned. If we accept the dictum that the protective barriers in normal health are sufficient to stay off the invasion of infection then we shall be obliged to consider also the causes which weaken these protective barriers and permit the invasion of disease. And if we include the methods and reasons whereby we are exposed to disease, how contagion is carried, we are entering into the interesting field of preventive medicine which we know is only in its infancy.

The speculation as to what will develop along these lines during the next generation is indeed interesting to contemplate.

Then we have a large field of diseases not to be classed as of infectious origin. Diseases due to physical causes, disturbances of the circulation and of metabolism, the anaemias, pernicious anaemia and other so-called deficiency diseases, diseases of the endocrine glands, including diabetes,—mental and nervous diseases; a large and interesting group in which work has been done but in which the causes require much study yet before they are fully determined.

We often speak of high blood pressure as the cause of this or that physical disturbance using the term as though it is a final factor in disease. Yet we are obliged to ask again what makes high blood pressure and to this question the fully satisfactory answer has not been given. To state that it is process of age or that it is due to the influence of toxic substances in the system or that it is dependent on hereditary bad tubing, leaves much yet to be answered on this subject.

Our knowledge of the diseases of the circulatory system and chronic nephritis is still limited. Of the nature of some of the heart and kidney conditions we are having to change our earlier conceptions and will no doubt still have to modify them considerably more.

The problem of the cause of cancer and other tumors is baffling the medical profession at the present time. What the determining factors in cancer are we do not know nor do we know whether the discovery of these factors will bring with it the method of cure.

We have gone farther perhaps in our knowledge of diabetes than in many of these diseases since the discovery of the use of insulin by Banting and the clinical studies by Joslin, Allen and others. Yet this study is more in the way of treatment and little do we know of the true cause of the disease.

We have but recently opened the door to the knowledge of the endocrine glands and their

effects. Where this study will lead us and what it may reveal we have no conception.

Our lack of knowledge of the anaemias is striking in spite of the splendid work in the way of liver and high protein diet in the pernicious anaemias by Minot and Murphy. Yet again this is largely in the line of treatment and we still have much to learn of this and allied diseases. Just why we do not get in other forms of anaemia the same benefit from the same line of treatment that we do in the pernicious type we do not know nor can we satisfactorily explain the stomach acid deficiency in pernicious anaemia.

We are still groping in the dark as to its true causation. There is much for us to determine in the line of so-called diseases of deficiency. By the excellent work of Goldberger in pellagra we are convinced that that also is to be classed as a deficiency disease due to the lack of certain vitamins, but what the nature of these vitamins is we are yet ignorant.

We are but on the threshold of our knowledge of physiochemistry and this is a subject that is having our increased attention at this time. Of the chemical processes going on in cell life we know but little and of the part electrical conductivity plays we have yet to learn.

Our knowledge of brain physiology and brain pathology is embryonic. Our interpretation and classification of mental cases we are having to revise according to newer understanding of their etiology. Upon this knowledge rests much of civic importance. The burden of the large number of individuals in the institutions for criminals, for the insane and for the feeble-minded and the many at large uncared for are a challenge to the world and of this the medical work must assume its share. Just how far this burden can be relieved by the better understanding of the etiology of abnormal conditions and treatment based on better etiological knowledge with measures aimed at prevention is a story yet to be told.

Of the intereffect of the emotions and the internal glandular secretions and the effect of these secretions on our well-being or ill health our knowledge is only suggestive.

The vision of Dr. Carrel in this connection is far-reaching when he says, "The knowledge which permits the evolution of judgment, imagination, kindness, or courage in a race, family or individual or the conditions that bring about the disappearance of these qualities would give the human race far more happiness than the complete eradication of plague, cholera and typhus from the earth."

The time will never be reached when we will have solved all the problems of medicine,—every increase of knowledge serves but to reveal how much more there is beyond each horizon of our knowledge. But never before were we able to bring to bear such an accumulation of evidence toward the solution of the etiology of diseases as today with the records of cases at hospitals and their laboratory reports, and institutes and laboratories doing research work, and the large research laboratories pursuing studies in etiology along the more scientific lines.

Advances in our knowledge of medicine having bearing on the etiology of disease will be more and more pronounced as a result of increased research. The focusing of more and more effort on any one problem will surely have its effect. Every step forward helps us to see more clearly the path ahead. As scientific research goes on at ever increasing speed we can the more reasonably look forward with large expectation. Take the instance of cancer. The combined efforts of institutes such as the Crocker Institute in New York, The Huntington Memorial, the Institute for Cancer Research in London and others cannot long fail to put on a basis of satisfactory record the cause of cancer. Either some yet unknown cause will be brought to light or theories all ready advanced will have so much evidence produced in their favor that there will remain no further doubt as to its etiology and life story.

The search for and discovery of the scarlet fever germ by the Dicks at the Chicago Institute, after investigations carried on over seventeen years, illustrates both the efforts sometimes needed and how successes are to be accomplished.

We are all familiar with the efforts which are being directed at the present time toward the discovery of the cause of anterior poliomyelitis in which our own Vermont Research Foundation is in the van.

Through the research work of Ruth Tunnicliff the determination of the cause of measles has been practically made. Within the next few years the study of the common cold will have much more attention than it has had up to the present. The time will soon come when the importance of colds and respiratory infections will be much better appreciated and measures of control of these diseases will be instituted. We will not be content with conditions as at present along these lines. Already a fund has been established at Johns Hopkins for research work in these diseases.

Though the germ causation of smallpox, chicken-pox and mumps remain yet to be determined, yet one does not hesitate to feel that when the spotlight of medical research is turned fully upon these their causes will soon be revealed.

The effect of our increased and better knowledge of the etiology is indeed interesting, some phases of which invite our attention in this consideration.

Through the result of measures of disease control, based on the knowledge of causation, have been made possible such accomplishments as the building of the Panama Canal. It has

also made possible international commercial relationships which could not have otherwise been established. It has not only added twenty years to the average length of man's life since modern medicine began, but likewise the value of a life has been enhanced. It brings about relief from suffering. For example note the benefit of antitoxin in diphtheria with threatened suffocation from laryngeal involvement, than which there is no more terrifying picture. What a relief from suffering would be brought to the world by the discovery of the cause of cancer and its treatment, if possible by means of some chemical nature.

One of the aims of present day medicine is the further alleviation of suffering by such better interpretation of mental and nervous diseases as will enable the patient to improve, possibly to perfect his adjustments, both personal and social, to his surroundings. A lack of such proper adjustment is I believe one of the most striking causes of human suffering. Samuel Butler has said: "All our lives long, every day and every hour, we are engaged in a process of accommodating our changed and unchanged selves to changed and unchanged surroundings; living in fact is nothing else than this process of accommodation." It tends toward conservatism in surgery, which surgery itself welcomes. In this connection the writer reflects on his student days, the days of the '90's, when at the usual surgical clinics about one-third of the operations were for cervical glands and half of the others were for the removal of some part of the female pelvic anatomy. A student in the clinic of today rarely sees an operation for cervical glands. Referring again to cancer it is not impossible that the discovery of its etiology may bring with it the use of some chemical means of cure as has been suggested, and thus often relieve the need of surgery. I venture to hope that the generation to come may find chemical or other reasons to conclude that the Lord was not so many times mistaken in the usefulness of tonsils as one of Nature's first line defences.

The increased accumulation of medical knowledge brings with it many problems affecting the general practitioner. The field of medicine has grown so big that it has long outgrown that which one man can cover. The period of the lifetime of any one man is too short to grasp it all, hence the necessity of increasing specialization, the circle ever growing larger with the inevitable tendency to get farther and farther away from the patient as an individual. The general practitioner holds the center of responsibility for the best interests of the patient. The general practitioner is the most important single individual in medicine. He sees the majority of the people. His connection with the patient and family is closest, and his contact usually the earliest. Osler says, "It cannot be too forcibly brought home to us that the hope of the profession is with the men who do its daily work in general practice."

The development and importance of the general practitioner has not kept pace with the development of specialists. Medicine recognizes this, the public recognizes it. In many places this is keenly felt, particularly in large cities. Patients, particularly of the middle class, do not many times know where to turn in illness. Charity clinics are provided for the poor, the rich have means to go to any lengths, but for the self-supporting man of moderate means the stress is often very acute. Group medicine has in some places and to some measure helped out. Medical education recognizes the need, and measures yet somewhat experimental are being taken to overcome the difficulty.

In an effort to recover the value of preceptorship in medical education, such as the apprenticeship with the older M.D., in early medicine, many schools are now adopting methods to bring the medical student in closer contact with his teacher and with the patient. Our own University of Vermont has this year undertaken the innovation of largely concentrating the didactic teaching into the first three years and for a part of the last year sending its medical students out to serve directly in the different clinics, hospitals, laboratories, state institutions, and to receive training with private physicians selected for this purpose so that the student before entering upon general practice may have much more of the actual contact with the practical application of medicine and be more versed in medicine as an art.

Never before has the general practitioner had so ample an opportunity to approach the study of his cases with so full consideration of the etiology of disease in mind. The practitioner should emphasize in his mind: First, the importance of accurate history, getting the whole picture with the etiology. Second, the recognition of every factor which may then or later produce destructive changes, making sure that as far as possible these factors are cleaned up before the case is released from observation. Third, the recognition of diseased states in their earliest stages or even in their predevelopment. Fourth, he should foster the best sort of co-öperation between the specialist, the patient and the general practitioner with readiness to refer patients for advice on special branches but not too ready to relax his share of the responsibility for the continued care and the recovery of the patient. Fifth, he should interest himself with problems of civic and public welfare and particularly by better interpretation of mental and nervous states in that which pertains to the best health of the state, and particularly of his community. Finally, he should encourage measures of preventive medicine, realizing the fact that it is the function of the practitioner to keep people in good health fully

as much as to cure them of diseases, encouraging periodic examinations which should begin in early life.

The continued application of these aims in his professional practice will give the general practitioner the privilege of playing a large part in making the future of medicine one of the most thrilling adventures in the world.

MISCELLANY

CAPITAL INVESTMENT IN MEDICINE

At the time this note is being published many Vermont physicians will have received from the office of the American Medical Association a questionnaire seeking information as to their professional financial investment. At first sight this questionnaire may seem either inquisitive or bothersome, or both, but it is intended to be neither.

Recognizing the fact that the cost of sickness is great and that physicians are not becoming wealthy, the Committee on the Cost of Medical Care are seeking for information for the purpose of ascertaining the exact facts of the situation and, if possible, to be able to suggest some remedies.

We, ourselves, are the American Medical Association. This questionnaire is being issued by ourselves through our constituted officers to ourselves. The more complete the co-öperation, the more valuable the result. There should be no undue difficulty in making a reasonably correct estimate upon which to base the answers.

W. G. R.

VERMONT DEPARTMENT OF PUBLIC HEALTH

Reports of communicable diseases for the month of December are as follows: Chickenpox 132; diphtheria 18; German measles 8; influenza 301; measles 93; mumps 342; poliomyelitis 1; scarlet fever 90; smallpox 5; whooping cough 244; tuberculosis 17.

The Laboratory of Hygiene made 1,453 examinations divided as follows:

Examination	
For diphtheria bacilli	346
For Widal reaction of typhoid fever	12
For malarial parasites	1
For tubercle bacilli	246
For evidence of syphilis	321
For gonococci in pus	151
Of blood for contagious abortion in cattle	90
Of water, bacteriological	109
Of milk, market	15
Of milk submitted for chemical only	2
Of milk submitted for microscopical only	14
Of foods	17
Of drugs	2
For the courts, autopsies	1
For the courts, miscellaneous	10
Autopsies to complete death returns	0
Miscellaneous examinations	46
Examinations of water, chemical and bacteriological	70

In the Division of Venereal Disease, 39 cases of gonorrhea have been reported, 53 cases of syphilis, 2 cases reported for gonorrheal treatment, 19 for syphilitic treatment, 19 for intravenous treatment; 120 outfits for treating gonorrhea and 148 Wassermann outfits were distributed.

The Poliomyelitis After-care Division made 41 home visits, seeing 46 patients. Six doctors were visited, 16 new pieces of apparatus were fitted, 19 orthopedic corrections made to shoes, 5 pieces of apparatus were altered. One patient was admitted to the Children's Hospital.

The nurse of the Maternity and Infancy Division gave seven talks in six towns. Preparations have been made for conducting classes in thirty high schools and one normal school. Plans have been formulated for the Institutes on various phases of maternal and infant care, these Institutes to be held with the county medical societies.

MEDICAL PROGRESS

CARDIOVASCULAR REVIEW*

Review of the Literature on Cardiovascular Disease for the Year 1927

BY ROBERT S. PALMER, M.D.,† AND HOWARD B. SPRAGUE, M.D.†

(Continued from Page 141, Issue of January 17)

10—Radiography

Baum described the normal hilum shadow (which is the pulmonary artery) and its relation to the heart shadow. There is normal space between the hilum and the heart, more marked on the right. If this is absent, one may conclude that pathology is present, hilum tuberculosis, Hodgin's disease, neoplasm or possibly enlargement of the right heart or changes in the pulmonary artery.

Bordet states that the shadow of the heart in sclerosis of the pulmonary artery is spherical or ball shaped whether the sclerosis is primary or secondary and that it is not unlike the shadow seen in congenital stenosis of the pulmonary artery. It may be confused with great hypertrophic dilatation of the left ventricle. The symptoms are usually limited to dyspnea and cyanosis. In the absence of valvular lesions and aortic sclerosis and where sclerosis of the pulmonary branches is apparent, the enlarged shadow must be attributed to hypertrophy of the right ventricle alone.

Brown and Weiss stated that

(1) "The position of the heart in the lateral view of the thorax is oblique.

(2) The configuration of the heart shadow is oval. Changes in the volume of the heart and of the individual chambers can be recognized.

(3) The heart is located in the anterior half of the thorax.

(4) There are two transparent triangles due to lung tissue, one situated in front and one in back of the heart.

(5) There is a definite relationship of the heart to the aorta, and of the heart and aorta to the thorax."

Chamberlain and Dock have studied the heart by roentgen ray cinematograph (Ruggles) and find variations in the shadow corresponding to clinical determination, of the predominance of regurgitation or stenosis in mitral disease.

Kalisch reported a diagnosis of cardiac aneurysm made by x-ray, confirmed by necropsy. Death resulted from perforation into the pericardium. Etiology was probably coronary sclerosis.

Schwartz found the roentgen ray findings of pulmonary artery dilatation together with the lower voltage electrocardiograms showing right axis deviation and the smaller T waves were a great help in differentiating pulmonic insufficiency (Graham-Steel murmur) from congenital defects and from aortic lesions.

*From the Cardiac Clinic of the Massachusetts General Hospital.

†For record and address of author see "This Week's Issue," page 202.

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11—Pharmacology

The observations made by *Blalock* offer a rational experimental basis for the belief that the preoperative administration of digitalis may be of considerable value in the preparation of certain types of patients for operation under general anesthesia. They also suggest that this drug should not be used during shock following operations.

Burwell et al. studied the effect of digitalis on the output of the heart in normal man and found that 1.4 to 2.7 gm. of digitalis leaf caused a dimunition in the output of the heart per minute and per beat and in the basal pulse level. When nausea was produced there was a tendency for the minute volume to return toward normal. The pulse rate remained slow, thus the stroke volume increased to above normal for the individual. With subsidence of the nausea the cardiac output again diminished.

Gilchrist and Lyon found that digitalis produced inconstant and comparatively slight results in the absence of auricular fibrillation. When fibrillation was present the amount of slowing was found to be proportional to the heart rate when the drug was given.

Harrison and Leonard found that digitalis decreased the minute volume output of the heart in dogs and in this way was a sedative. At the same time they emphasized the point that digitalis had a tonic effect and reduced cardiac dilatation.

Danzer finds support for his "venostat" in the finding that digitalis decreases cardiac output.

Cohn, Stewart and Gilchrist have taken exception to the statement of Harrison and Leonard that digitalis decreases cardiac volume output and rate of blood flow. Cohn et al. aver that Harrison and Leonard have not considered heart size which in disease is increased and which is decreased by digitalis with a reduction in blood flow.

Macht and Krantz found that the growth of Lupinus Albus seedlings is inhibited by solutions of digitalis and recommend this method for assaying the potency of digitalis tinctures. It is a saving in time, money and labor and

shows less variation than the cat method according to the authors.

Martin found that clinical tests compared favorably with biologic ones in estimating potencies of digitalis preparations.

McFarlane and Masson found a group of cats with a high resistance to digitalis which cause marked errors in estimating the strength of the drug by the cat unit method.

Anrep and Stacey studied the comparative effects of various drugs on coronary circulation and found small doses of pituitary extract and caffeine had very little effect while carbon dioxide definitely decreased coronary flow and epinephrine increased it.

Blalock's experiments indicated that routine use of alkali preoperatively is not advisable.

Camp found Alpha-Lobeline an undependable drug as a respiratory stimulant and noted a deleterious effect on the heart muscle as well as a marked vagus stimulating action.

Norris and Weiss investigated the pharmacological and therapeutic properties of Alpha-Lobeline. Its action according to these investigators is similar to that of nicotine on medullary centers and was found to be variable on animals poisoned by morphine, chloral, barbituric acid and carbon monoxide also on animals with depressed respiration due to increased intracranial pressure. The drug was found unreliable as a stimulant in man, carbon monoxide and oxygen being a more effective stimulant.

Whitehead and Draper did not find cardiazol effective as a cardiac and respiratory stimulant in cats and dogs. Stimulation of respiration could be obtained with less dangerous side effects by Alpha-Lobeline.

Chen found: "Pseudo ephedrine hydrochloride dilates the pupils of man when applied locally, raises arterial blood pressure in dogs when injected intravenously and slightly increases the systolic blood pressure in man when given by mouth. Pseudo ephedrine is dextrorotatory and is less powerful in pharmacologic activity than ephedrine, which is levorotatory.

Middleton and Chen observed the action of the drug ephedrine on 41 patients and concluded that when given by mouth a rise in blood pressure of 28.5 mm. average is produced in an average time of five hours and nine minutes. The therapeutic dose is one to one and one-half grains. The diastolic pressure is also elevated and the pulse is more often accelerated than slowed.

Frommel concluded that calcium reinforces the contraction of the heart, increases the excitability and diminishes the conductivity.

Gruber found that the phosphate ion and adrenalin increased the tonus waves of the excised terrapin auricle. Concentrated adrenalin however decreased them. Pituitary increased them and would restore them if absent, an effect adrenalin did not have. Histamine had the same effect. Pituitary extract and histamine are antagonized by large doses of adrenalin.

Guggenheimer and Fischer found that strong perfusions of iodine depressed contractible power while weaker ones caused vasodilatation. A quarter to a half grain of sodium iodide divided in three to six doses daily had a favorable effect in cases of vasoconstriction.

Halsey, Reynolds and Blackberg observed the cardiac output in dogs as influenced by chloral, chloroform, quinidine, quinine, homocamfin and ephedrine. Chloral increased heart output while lowering the blood pressure, and increased the heart rate. In two out of eight experiments chloral decreased the output. Chloroform lowered both output and blood pressure. Ephedrine reduced heart output and rate and increased pressure. Homocamfin caused a decrease in heart output. Quinidine according to these workers increased heart output, blood pressure and rate of heart. Quinine raised the output and pressure in one animal.

Harrison, Pilcher and Wilson observed the effects of calcium, barium and potassium in the cardiac output of normal dogs concluding "that calcium and barium have no action on the heart which digitalis does not have to a much more efficient and safe degree . . . potassium in the doses used has no significant action".

Koesser, Lewis, and Walker found evidence for the production of bacterial asthma or bronchiolar spasm and certain forms of arterial hypertension by bacterial growth filtrates.

Master noted the effect of sodium salicylate on the normal human electrocardiogram and found no changes. Changes noted by other workers in the author's opinion are due to rheumatic fever.

McCann was able to produce a diuresis of water and salt lasting several days after transient elevation of the blood serum calcium in three patients with edema of nephritic origin by the administration of parathyroid extract—Collip.

Pilcher et al. concluded from animal experiments that epinephrine may be ineffective and possibly dangerous in the treatment of acute circulatory failures.

Pilcher et al. found that caffeine sodiobenzoate in doses corresponding to therapeutic doses used in man had no beneficial action on the cardiac output in dogs. Moreover no change was observed in respiratory rate or depth.

Weiss and Hatcher reported that 95% of intravenous dose of quinidine leaves the blood in five minutes. Toxicity varies with rate of injection. Elimination is essentially complete in three to four hours. Lethal dose then required is as much as before. Quinidine is not synergistic with ouabain or digitalis in toxic doses.

Wiggers found that epinephrine affects the vigour and velocity of individual fractional contractions directly, producing "an increased gradient of isometric pressure rise, a higher

pressure maximum, an abbreviated systole, a steeper isometric relaxation gradient, an earlier termination of relaxation and a more complete diastolic relaxation". Moreover, secondary effects, as peripheral vasoconstriction intensify the stimulating reaction.

The effects of camphor and strychnine were summarized as follows by *Wilson, Harrison and Pilcher:* "The effects of camphor were inconstant. The cardiac output and consumption of oxygen were usually not significantly altered although decreases and increases sometimes occurred. Strychnine varied according to the amount of the drug administered" and was inconclusive.

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12—Treatment

Smith, Gibson and *Ross* found a diet low in salt and high in carbohydrate effective in fifty cases of cardiac failure. The authors believe the Karel diet lacking in energy. The authors' diet is: 2100 cal.—p. 44 gms., f. 110 gms., CHO 222 gms.; fluids to 1500 cc; salt minimum.

Christian finds the edemas of cardiac origin most responsive to diuretics. Theocin 0.3 to 0.5 grams three times a day is a very useful diuretic. When not tolerated, diuretin 0.5 to 1 gram three or four times a day may be used. Novasurol is the most effective but due to its mercury content (33.9 per cent.) it must be used with even more care than other diuretics in edema of renal or combined cardiac and renal origin.

Gohrbandt reported three cases whose lives were saved by intracardiac adrenalin, one case of narcotic poisoning, and two cases of collapse post operative. This author reviews the subject.

Donzelot has advised the less generous use of antiluetic therapy to vascular and cardiac lues. Even when heart, kidneys, and liver are functioning well the treatment should be started gradually. He prefers mercury to both bismuth and arsenic.

Hollingsworth reported a case of a woman 68 suffering from an average of three Adams-Stokes attacks every ten minutes. One capsule of ephedrine 0.05 gm. by mouth every morning entirely prevented the attacks. After three weeks the drug was withheld but the attacks recurred in forty-eight hours. The trembling in the knees which accompanied the drug at first, disappeared on continuous administration.

Leech's clinical researches on the action of cactina pillets lead him to the conclusion that it is entirely inert.

An extract of marrubium was found by *Pages* and *Comte* to exert a favorable action on extrasystolic arrhythmia. Auricular tachysystole and fibrillation were improved in some cases. The action of marrubium seems comparable to that of quinidine. No contraindication revealed itself. Marrubium probably owes its favorable effects on extrasystolic arrhythmia to a cardiotonic action operating through the vegetative nervous system.

A brief history of mercury as a diuretic together with a consideration of the newer mercurials has been published by *Rathory and Maximin.* Novasurol, salyrgan and Neptal were mentioned, the authors finding neptal more ef-

fective than novasurol. Lean discussed this paper and reported two cases of ascites cleared up by salyrgan.

Sezary has reviewed his experience with antiluetic therapy in cardiovascular lues. Under treatment two out of three aneurysms of the arch grew worse and one was improved symptomatically and the tumor did not progress in size. Four cases of angina were helped and three were not helped by treatment. Five patients suffering from aortitis were improved. Severe asymptomatic cases had their Wassermanns changed to negative under treatment. Cerebral vascular lues can be cured, in the author's opinion, by proper treatment.

Burrage and *White* "critically" examined 221 cases of pneumonia, 49.8% of whom received no digitalis and 50.2% of whom received varying amounts of the drug. Those receiving non-digitalizing doses showed a mortality 3½ times as high as those without digitalis. The lowest mortality was found in those patients who were digitalized and next in those receiving no digitalis.

Hay and his coworkers believe that digitalis is indicated in heart failure with normal rhythm. Clinical improvement was noted in certain cases without edema.

The administration of digitalis in suitable large doses under properly controlled conditions, to patients with advanced congestive heart failure, regular rhythm and considerable edema, appears to cause improvement consistently in only one group—the group designated by *Marvin* "arteriosclerotic heart disease", but frequently referred to as "chronic myocarditis" or "myocardial insufficiency". The drug has been found occasionally beneficial in patients with syphilitic heart disease, but almost devoid of effect in rheumatic heart disease. The same differences have been noted with regard to the effectiveness of diuretic drugs administered after complete digitalization. Persons with rheumatic heart disease seldom show satisfactory diuresis; those with arteriosclerotic heart disease, as a rule, respond in a highly favorable manner. It is suggested that differences of opinion concerning the effect of digitalis in heart failure with normal rhythm may depend in part on differences in the patients selected for treatment. It is believed that a division of patients on the basis of the etiology of the heart disease is essential for the proper correlation of the results of different observers.

Robinson believes that in acute myocardial failure with small pulse and low blood pressure, with rapid weak heart sounds as in hemorrhage and surgical shock the output of the heart is reduced and that digitalis is contraindicated as it will cause further diminishing of cardiac output. Fluids should be administered and warmth applied. This type of heart failure may occur in pneumonia. Early in pneumonia, digitalis should be used when the heart output is increased but it should be stopped when signs of failure set in.

Wyckoff and *Goldring* gave 248 intravenous injections of strophanthin to thirty-two patients who had heart failure, without fatalities or harmful effects. A definite cardiac effect was noted after 163 injections. The initial effect was noted in from five to twenty minutes, and the maximum effect in from fifteen to fifty minutes; as a rule, the larger the dose, the earlier the initial effect and the more delayed the maximum effect. A greater amount of strophanthin was necessary to reduce the ventricular rate in patients who had auricular fibrillation with elevation of temperature than in those without elevation of temperature. The variation in dosage was less when calculated on the basis of body weight than on the basis of total dosage. The persistence of action of the drug was variable in the cases observed, but in all except three the persistence was never longer than five days. Mild toxic symptoms were noted in three of fifty-two instances in which full therapeutic effects were obtained. It would seem that strophanthin, if given in fractional doses, may be administered with safety intravenously to patients with auricular fibrillation who have not received digitalis recently. When strophanthin is given to patients with regular sinus rhythm, greater care must be used. In these patients, clinical improvement seems to be the only criterion for full therapeutic effect; and since moribund patients may not show clinical improvement, there is greater danger of overdosage.

Bardier and *Stillmunkes* concluded that quinine or quinidine prevents chloroform epinephrine syncope in dogs due to opposing action, i.e. quinidine is a vasodilator while epinephrine is a vasoconstrictor. Further quinidine favored reanimation of the heart by epinephrine in case syncope recurred.

Barrier finds the dangers of quinidine overstressed and believes that it is a useful drug in all cardiac arrhythmias produced by circus movement.

Brown, Alt and *Levine* found no appreciable therapeutic effects of diathermy on the circulation of normal rabbits and dogs. The blood pressure tended to rise slightly and the pulse tended to fall during the experiments but the effect was temporary and the dose was greater than that usually employed.

Greene reported a case revived after the heart had apparently stopped beating. Massage of the heart, artificial respiration and intracardiac adrenalin were employed. No cardiac contractions were felt until massage had been continued five minutes. Apparently the cerebral anaemia had a distinct dulling effect on the higher cerebral centers lasting about three weeks.

Robey and *Freedman* emphasize the importance of a history of sore throats as well as diseased appearance of tonsils as an indication

for operation. They believe it is the most effective preventive measure in rheumatic fever and rheumatic heart disease. Furthermore, in the authors' opinion, tonsillar remains may be as serious as the original tonsil.

White discussed the use of such valuable measures as rest, recreation, (physical and mental), exercise, climate, psychotherapy, physical therapy, diet, surgical intervention and venesection in heart disease. These may be the most important measures at times.

In the case of Angina pectoris, treated by roentgen ray reported by *Ecker* the roentgen rays were directed to the lower cervical and upper five dorsal vertebrae. The dose was 5 milliamperes with a 9 inch gap at 10 inch distance through 5 millimeters of aluminum for six minutes. This was a suberythema dose. This treatment has been repeated twelve times to date. The intervals of treatment have varied from ten days to four weeks. The patient still has substernal pain after exertion or emotion, but there is not transmission into the arm, and the attacks are promptly relieved by glyceryltrinitrate. The pain is decidedly less severe, much less frequent, and is not accompanied by angor.

Hartman showed, experimentally and by autopsy, material from cases of mediastinal or lung tumors treated by roentgen ray, that characteristic pathologic changes may be brought about in the heart.

Levy and *Golden* irradiated 20 patients with rheumatic carditis 139 times. Changes in the electrocardiogram were observed in 14. The changes were similar to those seen in the course of the disease and the authors suggested that irradiation caused a modification of the rheumatic lesions. Seventeen of the twenty showed improvement. There was no evidence of cardiac injury or unfavorable effect on the course of the disease. In two cases of streptococcus viridans endocarditis roentgen ray irradiation caused no change in the electrocardiogram and did not modify the fatal course of the disease.

Warthin and *Pohle* found that a roentgen ray exposure corresponding to a human erythema dose did not produce definite and irreparable injury in the heart muscle of adult rats and rabbits.

Eyster and Middleton studied 21 cases observing the venous pressure and the effect of venesection. A venous pressure of 21 cm. was taken as an indication for venesection. This procedure was found useful, the effects being, in the authors' opinion, mechanical, relieving of the load. Venous pressure was found useful in prognosis. Those cases which showed a return of the high venous pressure after relief by venesection had the least reserve.

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SURGERY IN HEART DISEASE

Albrecht discussed acute suppurative pericarditis. He reported a case in which a projectile lodged in the posterior mediastinum. A right infected hemothorax resulted from which the patient recovered in three weeks. One week later he developed pericarditis apparently from lymphatic extension. The pericardium was opened and a dependent drain left in. Uneventful recovery followed. The author advises tapping the pericardium at the angle of the 7th rib and sternum directing the needle upward and outward.

Allen reported eight cases of periarterial sympathectomy. He believes the operation of Royle and Leriche as used by Adson or ramisectomy alone as advised by Royle has a very limited field in cases, where the circulation is adequate, with vasomotor or trophic disturbances of short duration. Allen found no ill effects from the operation. Proper protection post-operatively must be given.

Cutler has decided that the complete Jonnosco operation on both sides offers the greatest

hope of lasting relief in angina pectoris. A complete unilateral operation is well borne though a first stage cervical sympathectomy may be advisable in some cases.

This same author states that operations which divide the known sensory pathways in the sympathetic nervous system connecting the heart with the central nervous system give a fairly high percentage of satisfactory results. It is apparent also that the complete Jonnesco procedure achieves part of its success because it interferes with a motor autonomic reflex as well as interrupts the sensory pathways. Whether this operation is unduly extensive, as proposed by Danielopolu, and whether division of the sensory elements entering and leaving the two lower cervical and the first dorsal ganglions, but without removal of the ganglions, will yield more satisfactory results is still to be proved. The failure of any single procedure to alleviate the pain in all cases leaves the definite impression that much more is to be learned.

Hesse reported eight cases of angina pectoris treated by operation. Four were given complete and lasting freedom from attacks. He analyzed in addition to his own cases, 127 from the literature. The following conclusions stand out: 1) good results are obtained in 65%, moderate results in 13% and there is a mortality of 13%; one half of the fatal cases die from heart failure. Complete sympathectomy results in the highest mortality; 2) partial sympathectomy cures 62.9% as against 56% with the complete operation, gives unsatisfactory results in 9% as compared with 18% in the complete operation. In the author's opinion, superior cervical sympathectomy under local anaesthesia gives the best results, giving 80% of successes and a mortality of only 10%. 3) Depressorectomy is not recommended because of the inconstant location of the nerve and the poor results. It is better combined with sympathectomy. The author operated two patients under local anaesthesia during an attack and observed cessation of the pain on section of the sympathetic. 4) Extirpation of the superior cervical ganglion caused facial neuralgia in 36% of cases. 5) Sympathetico-tonic angina pectoris is differentiated into right and left sided sorts and indicates operation on the corresponding side. Bilateral angina indicates operation on both sides in two stages. Heart failure or marked loss of reserve is contraindication to operation. Early coronary and luetic aortitis do not contraindicate the operation.

Leriche and *Robineau* reported the rarity of good remote results in periarterial sympathectomy. Temporary relief may be obtained. When arterial walls are diseased the possibility of rupture of the vessels must be borne in mind.

Singer reported the case operated by J. Hofer, cutting the eighth cervical and first three dorsal spinal sensory nerve roots on the left. The operation relieved the left sided angina but right sided angina persisted. Horner's syndrome was present.

Winslow and *Shipley* operated for purulent effusion into the pericardium ten times, six being cured and four dying.

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13—Social and Economic Aspects of Heart Disease

A number of articles have been published under one cover by the *Rockefeller Foundation* describing representative cardiac laboratories and clinics in different countries, giving an account of their organization, maintenance and function.

During March, April and May, 1926, fifteen Boston physicians working in six teams carefully examined 3,311 school children aged 5 to 16 years out of 119,337 in the school population. Six hundred and twenty-five or 0.52 per cent. had organic heart disease, almost all rheumatic in type. Adding those sick at the time in hospitals the per cent. is .66. If all overlooked, wrongly diagnosed or sick at home were added a total close to 1% might be found but would certainly not exceed this. The incidence in the relatively best section of the city was .35% while it was 1.25% in the most crowded section.

Albert has suggested the following reasons for the increasing mortality from heart disease: 1) The increased length of life; 2) The decreased mortality from infectious disease including tuberculosis; 3) Old age deaths are really to be ascribed to that cause and not heart disease, 4) The increase in number maimed by scarlet fever and rheumatic fever.

Cohn treated heart disease from the point of view of public health. He concluded that the chief direction in which effort should be expended is to provide relief from distress. He believes judgment should still be withheld on the effectiveness of removing areas of infection to prevent rheumatic fever.

Conner has summarized the organized effort of hospitals, schools, convalescent homes and sanatoriums, employment bureaus and hospitals for permanent care to rehabilitate cardiac patients.

Mock and Moore in discussing the program for cardiac cripples in industry have emphasized among other things three important observations: 1) rheumatic heart disease is one of the

working class, 2) concentration of medical attention should not be on the breaking point but earlier, 3) tests should be instituted to sift out the potential cardiac to put him at a job which will spare him to continue earning.

Young, assuming that the mortality rate for rheumatic fever is an index of the prevalence of rheumatic fever, found evidence in support of the general feeling that the incidence of this disease has a close relationship to poor environmental status.

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14—Miscellaneous—Interesting Cases

Of miscellaneous reports relating to cardiovascular disease it is interesting to note the number describing heart rupture and also the not rare occurrence of malignancy of the heart.

Malignancy of the Heart

Cashion reported a case of metastatic carcinoma of the heart secondary to a malignancy of the penis for which amputation had been done the year before.

Lindsay records a case of primary squamous cell carcinoma of the wall of the left ventricle of the heart occurring in a woman, aged 77, who died from hypostatic pneumonia. The heart was not suspected, but at the postmortem examination a large white tumor, about the size of a hen's egg, was found in the anterior wall of the left ventricle. The whole of the alimentary tract was searched for a primary lesion, but none was found.

Morris reported five cases of metastases to heart from malignant tumors, three sarcoma and two carcinoma. In addition to cardiac involvement all showed associated involvement of lungs, pleura or mediastinal lymph glands. Cardiac metastasis was supsected during life in every case.

Nicholls reported a case of adenocarcinoma primary in the colon at the hepatic flexure with metastases in lungs, liver, spleen, pancreas and right ventricle. In 1882, Osler saw a similar case with the primary tumor situated in the uterus. Bell and Adami observed a third such case in 1899, the primary tumor being an adenocarcinoma of the stomach.

Rupture of the Heart

Goodall and Weir analyzed eighteen cases of rupture of the heart. Twelve of these cases were in men and two in women; the average age of the men was 69 and of the women 69.5. Two of these patients died in bed; three died after definite exertion, and nine died after no apparent special effort. As regards the site of the rupture, in eight cases there was rupture of the anterior wall of the left ventricle; in three cases the rupture was in the posterior wall of the left ventricle, while in two cases the right ventricle was ruptured. In every case the coronary arteries were calcified, while in four cases a definite obstruction existed; in one case antemortem clot was present. There was no history of previous heart disease in the men, except pains in the chest in five cases, two of which dated back only three and six days, respectively.

Crawshaw reports the case of a man 72 years old, found dead, as postmortem examination showed, of rupture of the anterior wall of the left ventricle. The left coronary was calcified and blocked by an old clot. He was found in a water closet. The author refers to a recent article (*Brit. Med. Jour.,* May 7, 1927) in which three similar cases were likewise found dead in lavatories. The author suggests that straining at stool may be a serious thing for patients suffering from coronary disease.

Chate reports the case of an edentulous man, aged 71, who was given a large cup of hot meat extract at 11 p. m. and a large cup of cocoa an hour later. One hour after the second cup he was found dead. Postmortem revealed a pale, flabby fibrotic myocardium and a rupture one inch long in the anterior wall of the left ventricle. The stomach was enormously distended and the author concludes that this, in embarrassing the heart, may have been the cause of the rupture.

Saphir reported a case, a boy aged five, who suffered fractures of right pubic and iliac bones without injuries to the chest in an automobile accident. Pathologic changes other than rupture in the heart were not found.

In one of the two cases cited by *Thomas and Tattersall,* the rupture occurred in the right auricle posteriorly. The heart muscle was soft and flabby, and there was considerable sclerosis of the coronary arteries. In the other case the rupture occurred in the left ventricle posteriorly. The ventricular wall was diffusely affected by a gummatous condition. The coronary arteries were sclerosed, and in the aorta were patches of atheroma sharply limited to the points of origin of the intercostal arteries. A feature of interest was that the thymus had not undergone its usual atrophic changes, but extended downward as far as the base of the heart. The patient was 62.

Clark reported four cases, death having occurred after intravenous injections presumably from over-loading the circulation.

Goljajew reported a case, a woman aged 48, with marked heart failure and anasarca and a history of two previous breaks. There was noth-

ing notable on physical examination. A free thrombus was found in the left ventricle. It measured 4.5 cm. long and 3.2 cm. broad. There was a large adherent thrombus in the left auricle. This is said to be the twenty-fourth such case.

Hyman recorded four cases of post-influenzal bradycardia. The pulse rate in these cases varied from 36 to 60. In a case of complete heart block the rate fell to 28. The patient died two weeks later.

Lambert has reported a case of sarcosporidial infection of the myocardium, there being only one other such known. Infection by this parasite in animals is common. It has occurred in man so far as is known six times, affecting the heart muscle only once before.

Poll has observed a patient for more than three years, during which time he has had seven attacks of undoubted pericarditis, of short duration, afebrile in character and of unknown etiology. He says that a search of the literature has failed to reveal mention of a similar case.

A good clinical classification of the different rhythms with a few rules of thumb guides has been given by *Reid*. It should be useful for teaching purposes.

Vaquez and Donzelot state that the more important direct signs of abdominal aortitis are pain, enlargement, mobility and incurvation of the aorta. Indirect signs offered by some writers are fallible. X-ray study does not aid.

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Case Records
of the
Massachusetts General Hospital

ANTE-MORTEM AND POST-MORTEM RECORDS AS USED IN WEEKLY CLINICO-PATHOLOGICAL EXERCISES

EDITED BY R. C. CABOT, M.D.

F. M. PAINTER, A.B., ASSISTANT EDITOR

CASE 15041

RECURRENT HEMIPLEGIA IN A YOUNG MAN

MEDICAL DEPARTMENT

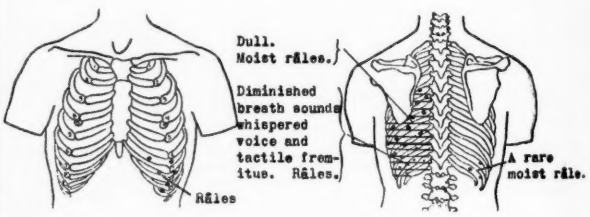
An American engineer thirty-six years old entered July 26.

At fourteen he had an attack of rheumatic fever with apparently complete recovery. After it his tonsils were removed. He had never had another attack, or chorea. He felt perfectly well, lived a life of normal activity, and played tennis and golf with no bad effects. During the war however he was rejected by both the Canadian and American armies. Five years before admission after an evening of bowling he had epigastric pain lasting twenty-four hours, not relieved by soda. At this time he had very transient right sided paralysis and was mentally confused for a few minutes. After nine months of rest and medical treatment he was able to work again, continuing treatment. Six months later he fell, had severe pain on the right side of the head, and paralysis of the left side of the body. He had aphasia for a long time, and since that time had never been able to think and speak quite so rapidly. The paralysis cleared up in time. He gave up work. A year later, three years before admission, he had a third attack of the same sort affecting the left side, again clearing up. Twenty months before admission he had two milder attacks within a month. After each of these attacks he rested in bed three weeks, then gradually got up and about again. Five weeks before admission he had his latest and worst attack, with left sided paralysis. During the last four attacks he had partial loss of sphincter control. Most of the symptoms cleared up after the last attack, but he did not regain strength or complete sphincter control. He was very nervous and slept fitfully. Until this week he had never had more than very slight dyspnea. For the past forty-eight hours he had been increasingly weak and dyspneic.

He had had hospital treatment for choleeystitis and influenza, as well as for his chief illness. He had had many abscessed teeth. For four years he had had gall stone attacks—severe colicky pain in the right upper quadrant with jaundice and pruritus. X-ray showed the gall-bladder to be full of stones. The last attack was a year before admission.

His father was said to have a "leaky valve", though he seemed well.

Clinical examination showed a very sick looking, sallow, cyanotic man propped up in bed in moderate respiratory distress. Sclerae slightly injected. Apex impulse of the heart diffuse and heaving, the point of maximum intensity in the fifth and sixth spaces eleven to twelve centimeters from midsternum. Also impulse in the second space to the left of the sternum. Left border of dullness 12+ centimeters to the left of midsternum, midclavicular line 7.5 centimeters, right border 4.5 centimeters, supracardiac dullness 5 centimeters. Sounds of fair quality. Rate 160. A systolic thrill at the apex. A systolic murmur and also a questionable diastolic at the apex. Pulmonic second sound accentuated. Radial pulse weak and irregular in volume and rate. Blood pressure 90/? to 120/80. Lung signs as shown in the diagram. Liver dullness 3 centimeters below



the costal margin. A questionable edge felt at this point. Spastic paralysis and beginning contractures of the left arm. Increased tendon reflexes. Clonus and questionable Babinski on left leg. Tongue deviated slightly to the left. Left sided facial weakness. Pupils equal, pin point (morphia), slight reactions to light and distance.

Urine: amount recorded only once, then normal, specific gravity 1.030 at two examinations, a trace to a large trace of albumin at both, occasional leukocytes at both, two red cells once. Blood: 15,500 leukocytes, 83 per cent polymorphonuclears, hemoglobin 70 per cent, reds 4,900,000. Smear normal. Hinton not recorded.

Temperature 98° to 107°; steady general rise with morning drop. Pulse 64 to 165 with deficit of 12 to 36 beats. Respirations 17 to 38.

The patient continued in an extremely critical condition. The morning after admission the apex beat was 160 to 180. By evening the rate was 108. He was incontinent and irrational. He grew weaker. July 28 the left chest was full of râles and there were râles at the right base. He had no bowel movement, but the abdomen was perfectly soft. July 30 he died.

Discussion

BY RICHARD C. CABOT, M.D.

NOTES ON THE HISTORY

The early lines of this history are of some interest because they are characteristic of what we see many times in this and in other hospitals. When people have an attack of rheumatism they ordinarily have another. But often if their tonsils are taken out they won't. If all the damage that is going to be done to the heart is done in the first attack we shall not accomplish anything by taking out the tonsils. But since it seems to be true that successive attacks of rheumatism have the effect of increasing the lesions on the valves, it is well worth while to take out tonsils after a person has had one attack of rheumatism as this patient had.

These transient paralyses, paralyses that entirely recover, are more often seen in rheumatic heart disease than in any other condition. When an old man gets a hemiplegia either it is permanent or it leaves some part of its paralysis behind. On the other hand, when a young man, as a complication of such a disease as this, gets a paralysis, he ordinarily recovers wholly. The reason is, in the old man we have bad brain arteries; in the young rheumatic we have young arteries which are capable of supporting the circulation.

The second seizure was probably another attack of the same kind, and his fall was due to his losing consciousness. The aphasia is somewhat surprising, unless he was left-handed. Ordinarily the speech center is on the left side of the brain and corresponds to a right-sided paralysis. This was a left-sided paralysis.

I do not remember any case of rheumatic heart disease having so many attacks of paralysis as this. I take it we have to suppose that in each attack a fragment of thrombus, presumably thrombus of the left auricle, breaks off and goes up into the brain. In other words, these are embolic hemiplegias each time. It will be interesting, if we have a post mortem brain examination here, to see if anything is shown of these lesions, whether the results of embolisms that happened several years before are still going to show after death.

We expect then rheumatic heart disease, which is ordinarily mitral stenosis.

NOTES ON THE PHYSICAL EXAMINATION

I suppose this impulse in the second left interspace means hypertrophy of the heart. I think we cannot say anything more. We see it in big hearts if the chest is thin. It is not likely, I think, to represent the left auricle, because the left auricle is placed so far back that unless it is very greatly distended it does not come into contact with the chest at all.

The thrill and murmurs are about what we expect with a mitral stenosis.

In the lungs there are evidences of dropsy. There is no evidence of nephritis I should say.

DIFFERENTIAL DIAGNOSIS

The physical signs here are of repeated hemiplegia, of passive congestion, and of a valvular heart lesion, all presumably parts of the same process, all due to the rheumatic endocarditis. We are prejudiced in favor of this being a mitral stenosis in view of the fact that rheumatic heart lesions show that much more often than anything else. A good many of them show besides the mitral lesion other valve lesions which we have not been able to detect during life. But I do not see any particular evidence here of an aortic lesion. The only murmur is at the apex. It is associated with a thrill. Nothing is said of its being heard at the aortic areas. Nothing is said of increased pulse pressure or Corrigan pulse; there is nothing to point to aortic stenosis,—no basal thrill or characteristic pulse. So I should say the evidence points to a mitral stenosis, as in our original guess.

I believe then that he has a mitral stenosis with a series of brain embolisms the last of which has been permanent and left him with a hemiplegia, with passive congestion of the lungs and liver and presumably everywhere else. Is that enough? We have this ascending temperature. It is quite a spectacular chart. We cannot tell much about the pulse on account of the pulse deficit. The temperature is going up all the time during the five days that he is here. There are three things we can say about that. (1) In the first place there is a brain lesion, acute or chronic, and acute brain lesions of any kind are liable to be accompanied by temperature without any other cause. Cerebral hemorrhages often show fever. So it may be that we can account for the fever that way. (2) It could also be accounted for by bland aseptic infarcts, or (3) by some infection. What infections should we have in mind as possibilities? Acute endocarditis I should say first, because acute endocarditis superimposed on chronic is one of the commonest findings in cases of this sort. There might perfectly well be pneumonia, covered up by the râles and dullness which we took for congestion. Beyond that I cannot make any guess.

The things which we are relatively sure of are a rheumatic valve lesion, presumably mitral stenosis and its results,—clots in the left auricular appendage and embolism from there. The thing we are not sure of is the cause of this terminal temperature.

A Student: Is hydrothorax often one-sided?

Dr. Cabot: It is often predominant on one side, and usually on the right side. To explain this, various hypotheses are advanced, none satisfying to me. Here the predominance is left and not right. One of the things that sometimes accounts for that is pleural adhesions, making

it impossible for any fluid to accumulate in the pleural cavity itself. That might be so here.

A STUDENT: Do you think vegetative endocarditis would explain the whole thing, the rise in temperature as well as the central nervous system involvement?

DR. CABOT: Ordinarily people with bacterial endocarditis have chills and talk about them. Then by the time a person has had vegetative endocarditis as long as this he should have had an anemia. I cannot rule it out, and I dare say there would be no way of deciding post mortem whether it was vegetative all along or only at the end. But certainly bland emboli can do all the brain mischief that we are told about in this case.

A STUDENT: Could he have an arterial process starting young and producing hemiplegias?

DR. CABOT: I think that is so improbable that we should not assume it. We have here a very probable cause for what exists. But arteriosclerosis in a young man is so rare that, on the doctrines of chances which we are obliged to follow, I should say no.

A STUDENT: Would vegetative endocarditis last for five years?

DR. CABOT: A good many cases lasting three years have been recorded. I do not believe the duration is enough to rule it out. I have seen myself a case where there was continuous fever for over two years.

A STUDENT: What do you call the origin of the emboli?

DR. CABOT: I suppose they broke off from an intracardiac thrombus. The commonest place for an intracardiac thrombus is the left auricular appendage.

A STUDENT: Has he not auricular fibrillation with a rate of 160?

DR. CABOT: Yes, I should say so. I believe there is auricular fibrillation. I did not mention that because it is not a thing we can verify post mortem.

CLINICAL DIAGNOSIS (FROM HOSPITAL RECORD)

Rheumatic heart disease.
Auricular fibrillation.
Mitral stenosis and regurgitation.
Aortic regurgitation.
Cerebral emboli.
Left hemiplegia.
Pneumonia?

DR. RICHARD C. CABOT'S DIAGNOSIS

Rheumatic endocarditis, mitral stenosis.
Thrombus in the left auricular appendage.
Cerebral embolism.
Chronic passive congestion.
Acute endocarditis? Pneumonia?

ANATOMIC DIAGNOSES

1. *Primary disease.*

Rheumatic endocarditis, mitral stenosis.
Thrombus in the left auricular appendage.

2. *Secondary or terminal lesions.*

Arteriosclerosis of the smaller coronary vessels.
Bronchopneumonia.
Chronic passive congestion.
Cerebral softening—three areas.

DR. TRACY B. MALLORY: I will read the description of the heart, which is very typical of a case of long-standing but not extremely severe mitral stenosis. The heart weighed 640 grams,—greatly enlarged and dilated. The apex reached four centimeters beyond the nipple line, the right border five centimeters to the right of the midsternal line. The dilatation was most evident in the left auricle, which was approximately twice the size of all the other three cavities put together. Next to that the right ventricle, which was approximately twice the size of the left. Along the small superficial branches of the coronary arteries were numerous minute nodular swellings which were shown later by histological examination to be in part arteriosclerotic from thickening and calcification of the intima, in part also healed rheumatic nodules, that is Aschoff bodies, shown by fusiform fibrous tissue thickenings of the adventitia so old that the characteristic mononuclear cells have by this time largely disappeared. The wall of the right ventricle, in spite of dilatation, was one-half centimeter in thickness, the wall of the left ventricle approximately normal. The columnae carneae were greatly hypertrophied. In the tip of the auricular appendage of the left auricle was a thrombus. The mitral valve showed marked fibrous thickening and partial calcification of the cusps and surrounding ring. It was significantly narrowed but still admitted readily the tips of two fingers. The chordae tendineae were thickened but not much shortened, and the valve margins approximated closely, so very probably there was no important degree of regurgitation. There were no fresh vegetations and no endocardial lesions on the other valves.

The tricuspid valve measured 18 centimeters in diameter, a very unusual figure, and it is not impossible that there may have been a relative tricuspid insufficiency.

The other organs showed a uniformly high degree of passive congestion. There was a bronchopneumonia in the right base. The gallstones which had been seen in the X-ray were present still in the gall-bladder. There were the scars of several rather old infarcts in the kidneys.

The brain showed three separate areas of softening of varying age, the freshest being in the right lenticular nucleus, an earlier one in the optic thalamus, also on the right, and a still earlier one in the right occipital lobe.

A STUDENT: What was the explanation of the epigastric pain of twenty-four hours? Did he have an infarct?

DR. CABOT: He had gall-stones, and gall-stones can give epigastric as well as right-sided pain. I think the best explanation would be gall-stones.

A STUDENT: What causes the embolism?

DR. MALLORY: An ordinary ante-mortem clot in the left auricular appendage.

A STUDENT: What did the kidneys show?

DR MALLORY: They were all right except for infarction.

A STUDENT: What about the signs in the left chest?

DR. MALLORY: He had a small amount of fluid in each base, but his pneumonia was in the right lower lobe.

DR. CABOT: I suppose we shall never know the answer to the question as to the cause of that fever, because we have at least two causes either of which could produce it,—the bronchopneumonia and the infarct. I do not know whether anything in the brain was recent enough to have anything to do with that.

DR. MALLORY: The final one in the right ventricular nucleus was quite recent.

A STUDENT: What was the degree of the bronchopneumonia?

DR. MALLORY: It was the major portion of the right lower lobe.

DR. CABOT: My guess is that he would have lived for a long time if it had not been for that pneumonia, because he was not much worse off as to his heart than he had been several times before.

CASE 15042

A NEW METHOD FOR THE TREATMENT OF SEVERE ANGINA PECTORIS

MEDICAL AND SURGICAL DEPARTMENTS

A married physician forty-seven years old was first seen in consultation by Dr. Paul D. White January 11. The story at that time was that for ten years he had had variable attacks of midsubsternal oppression on exertion. This sensation was often aggravated or brought on more easily after meals or on smoking. There had been a gradual increase in symptoms, but he had continued to work very hard.

There were no important infections in the past history. He had had his appendix removed sixteen years before. Eight years before his blood pressure was said to have been 195 systolic and albumin was found in the urine.

Several members of his family had had cerebral hemorrhage.

Physical examination showed him to be a large man with evident loss of weight. His breathing and color were normal. His pupils reacted normally and there was no arcus senilis. The apex impulse of the heart was felt under the sixth rib 10 centimeters to the left of the midsternal line. The sounds were of good quality, although the aortic second sound was accentuated. There was a slight apical systolic murmur. The rhythm was normal at the rate of 72. There was no obvious peripheral arteriosclerosis. The blood pressure was 180 systolic and 115 diastolic. An electrocardiogram showed normal rhythm, rate 80, slight left axis deviation and low T wave in lead II. He was advised to limit his activity and to use nitroglycerine if needed.

He was not seen again until February 2, thirteen months later, at which time his attacks of substernal oppression were becoming more severe and more frequent. He had had two attacks waking him at night. He had gained fourteen pounds, weighing 214 at the time of examination. The physical findings were essentially as before with the exception of a slightly greater enlargement of the heart and a weakening of the first sound.

On February 17 he had a severe attack of pain in the chest lasting for thirty hours, requiring a total dose of morphine of 1 3/8 grains in twenty-seven hours. The heart rate increased from 70 to 140 and the systolic blood pressure dropped from 180 to 120. His lungs showed many moist râles and he was coughing up a little blood. He was given digitalis intravenously and by mouth, totalling 1.9 grams in nine hours, with considerable improvement. The next day the temperature rose to 100.7°. He was forced to sit up straight in bed or to lean forward for relief of pain and dyspnea. Two days later his white count was 20,000.

He was able to go to the country during the summer. He felt well after recovering from this acute attack, but had recurrent periods of pulmonary edema. By August 28 the attacks of chest pain had become so frequent and severe that it was decided to try the effects of paravertebral alcohol injection. At this time eating or even holding a cigar in his mouth was sufficient to start an attack of pain.

Operation was performed September 4. He was discharged September 7 having no attacks of angina pectoris and no hyperesthesia of the chest wall. Physical examination showed the same cardiac condition and the electrocardiogram was essentially unchanged. The blood pressure was 156 systolic and 95 diastolic.

Following the operation he had no more pain except for a very slight attack during the first week, but continued to be weak, restless and to have attacks of cardiac asthma. His doctor reported that he was orthopneic and had marked edema of the lower body. He required much morphia. By October 26 the blood pressure had fallen to 90 systolic, 82 diastolic. The report stated that "the alcohol injections certainly relieved the pain and changed the whole picture, as, badly as he is now suffering, it is at least more tolerable than the anginal spells."

The patient died of congestive heart failure November 4, having no pain until four hours before death, when there was severe pain in the

lower abdomen, relieved temporarily by morphine. There was no change in the pulse at that time.

Discussion

BY HOWARD B. SPRAGUE, M.D., AND W. JASON MIXTER, M.D.

This case illustrates the value of a relatively new form of therapy in angina pectoris. It is applicable to patients who are suffering from severe pain while at rest, unrelieved by the usual procedures. It is based upon the theory that referred visceral pain is impossible when the sympathetic connections from the organ to the central nervous system are interrupted. The theoretical disadvantages of this are that by such an operation we are removing the warning pain of angina, as Mackenzie pointed out in relation to cervical sympathectomy, and that we may also be interfering with important regulatory reflexes of cardiac action. The first of these objections may be answered by saying that it is possible we may actually be partially preventing the vicious circle responsible for the anginal spasm by destroying the reflex, and the second by stating that our observations so far on one case bilaterally injected do not indicate any disturbance of sympathetic control.

A series of patients treated by paravertebral alcohol injection at the Massachusetts General Hospital was reported by J. C. White and P. D. White[1] in April, 1928. At that time five cases had been treated with relief of pain from 25 per cent to 90 per cent in four and no relief in one. Since then five other cases have been injected by Dr. W. J. Mixter and Dr. J. C. White, in all ten cases and eleven injections. Dr. White gives their results in a classification into four groups, according to percentage of relief. In 72.8 per cent of their injections they consider they had good results,—100 to 90 per cent relief in 36.4 per cent of injections, 90 to 50 per cent relief in another 36.4 per cent. In 9.1 per cent there was 50 to 25 per cent relief. In 18.1 per cent, which they class as failures, there was less than 25 per cent relief. There have been no deaths attributable to the operation.

The technical difficulties of the injection are not slight, since the area approached by the needle is 5 to 7 centimeters from the skin, in close relation to the pleura, and is reached by redirecting the needle point after touching the rib. The accidents to be avoided are injury to a blood vessel, failure to bring the needle point near enough to the sympathetic ramus for the alcohol to reach it, and injection of alcohol into the pleural cavity. By careful consideration of the technique developed by Mandl, Swetlow and Labat and modified recently by J. C. White it is possible to secure very good anesthesia of the region supplied by the sensory nerves injected and destruction of the delicate rami of the sympathetic system.

The effect upon the sensory nerve ganglion is presumably due to temporary edema and inflammatory reaction about the zone of necrosis produced by the alcohol, and results in some cases in a painful and rather persistent hyperesthesia lasting at times for several weeks. The possibility of this should be known to the patient before the operation.

One cannot assume that the life of the victim of severe angina pectoris will be prolonged by paravertebral alcohol injection; but there is considerable evidence to show that it may prove a valuable aid in making him more comfortable during the time that is left to him.

In the case here reported there was evident hypertensive and arteriosclerotic heart disease, with coronary thrombosis seven months before alcohol injection was tried, and the progress of the case indicated a very poor prognosis. The relief of pain, however, was striking, and the relationship between the injection of the third dorsal nerve and the cessation of the anginal attack which he was having during the operation is too direct to be disregarded.

Although this patient died two months later, it is certain that the relief given by the injection was definite and made the rest of his life more tolerable.

Operation

Under novocain, Labat technic, 5 cubic centimeters of alcohol was injected paravertebrally at the second, third, fourth, fifth and sixth intercostal nerves. The patient complained of some girdle pain, but stated after the nerve had been injected through the second needle (third rib) that his angina had been completely relieved.

Dr. Mixter: Alcohol injection as performed on this patient has been done in a moderate number of cases in this country with rather satisfactory result. The nerves blocked should be those supplying the area to which the cardiac pain is referred. It is probable that the rami communicantes are blocked by this procedure. In this instance the pain was almost entirely on the left side and was referred to the chest wall from the second to the fifth rib. It is to be noted that at the time of injection the pain was relieved when the injection of the third and fourth dorsal nerves was carried out. This procedure has not been carried out long enough for us to know whether regeneration of the nerve fibers takes place with recurrence of pain, but it seems probable on account of the thin sheaths of the fibers in the rami that permanent relief from pain will result in a considerable portion of the cases at any rate.

Reference

(1) Angina Pectoris—Treatment with Paravertebral Alcohol Injections. J. A. M. A. 1928, 90:1099.

Diagnosis

Hypertensive and arteriosclerotic heart disease.
Coronary thrombosis.
Angina pectoris.

The New England
Journal of Medicine

SUCCESSOR TO
THE BOSTON MEDICAL AND SURGICAL JOURNAL

Established in 1828

Published by THE MASSACHUSETTS MEDICAL SOCIETY under the jurisdiction of the

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Material for early publication should be received not later than noon on Saturday. Orders for reprints must be sent to the Journal office, 126 Massachusetts Avenue.

The Journal does not hold itself responsible for statements made by any contributor.

Communications should be addressed to The New England Journal of Medicine, 126 Massachusetts Avenue, Boston, Mass.

A GRAVE CHARGE

IN the *Boston Herald*, January 3, 1929, there appeared the statement purported to be made by Dr. Harold Rypins, that one out of every five persons practicing medicine in Massachusetts is a "quack". Dr. Rypins was quoted as Secretary of the New York State Board of Medical Examiners, an office of great responsibility in a great state, that takes education and the welfare of its citizens no less seriously than does Massachusetts.

What is to be thought of this statement? Is it what Dr. Rypins said? Some authority, perhaps the Massachusetts Medical Society, should ask Dr. Rypins to make a signed statement on this point. He may have been misquoted. If Dr. Rypins has been quoted correctly, he should be asked by proper authority, to present the evidence to substantiate his charges. Then the proper authority should sift the evidence and make public representations to indicate who is responsible for this unpardonable neglect of duty, perhaps on the part of the legislature in not providing appropriate legislation, perhaps on the part of the enforcing agency for not carrying out the provisions of the law.

It is not alone the medical profession that is interested. Every good citizen wants to know if the practice of medicine in Massachusetts is really so largely in the hands of quacks as it is represented by this speaker to be.

FEE SPLITTING

DR. JOHN A. HARTWELL, President of the New York Academy of Medicine in an address before the Academy declared at the annual meeting that the practice of fee splitting is an evil which has grown to alarming proportions. He gave the generally recognized definition of fee splitting and predicted that "disaster if not disgrace threatens the profession if it is tolerated."

Although this is a subject frequently discussed we are not aware of any very definite steps taken to root out this evil. If the situation in New York is as bad as claimed by Dr. Hartwell one may reasonably believe that no definite action other than verbal condemnation of the practice has taken place. Why should not the medical societies employ investigators who will ascertain the facts? If the practice is so prevalent that it is made the major subject of an annual presidential address some one must have evidence. We may suspect irregularity but suspicion does not warrant general condemnation. Astute investigators ought to be able to get the evidence.

GOVERNOR ALLEN AND PUBLIC HEALTH

As one studies the inaugural address of Governor Frank G. Allen the evidence of definite interest in public health and social problems is confirmatory of the expectation that his experience in public life has brought an understanding of many of the great needs in this Commonwealth. Concern for crippled children leads to the recommendation that the Hospital School at Canton should extend its facilities for larger numbers and in order to learn more about these unfortunates the suggestion is made for a survey of the State in order to learn how far additions and educational equipment must be provided for this class of State wards. The wish is expressed to have all child welfare laws revised so that conflicting statutes may be made co-ördinating. He finds that the Commonwealth has made an advance in the hospitalization of adult tuberculosis cases through the acceptance of the County Commissioners of Middlesex and Worcester of the plan for the building of county hospitals. He advocates extension of the facilities for treating cases of bone and joint tuberculosis at Lakeville and believes that the burden on society will become less in the future and the welfare of the patients increased thereby. Especial attention is given to the problem of safe milk supplies and the suggestion is made that legislation should be passed which will prevent disasters due to objectionable milk. He believes

that there should be creation of superintendency districts to promote better health service. His comments and suggestion with respect to the mentally defective are sound and constructive, and although recognition of the advanced work in this field in this State is recognized the hope is expressed that greater efficiency in dealing with delinquents earlier than is customary will be exercised.

The mortality due to automobile accidents is given attention with definite recommendations for dealing with all who may be responsible in such cases. His belief in the necessity of greater care in the licensing of operators deals with one of the fundamental preventive measures. In all probability much greater supervision in restricting the number of operators to persons who are physically sound and of good habits will be exercised in the future if his recommendations are adopted. We hope that the recommendations for more drastic punishment in appropriate cases will be approved.

We were especially interested in that portion of the address which was devoted to cancer. This campaign under the State Department of Public Health has been one of the outstanding achievements of the year and has given to Massachusetts a well deserved prominence in the problem of dealing with this disease. It was undoubtedly necessary to make use of Pondville in the beginning because it was immediately available but we would like to have the extension of this service studied with the possibility of having the State Cancer Hospital nearer Boston so as to be more accessible for patients and their friends.

The large tract of land and the buildings at Pondville might be of use in some other plan as for example as a part of the prison scheme of this State.

If the cancer hospital could be within a one trolley fare from Boston it would seem to meet the convenience of many who have to go there as patients or relatives of patients.

It may be that the State Department of Health has definite ideas about the future extension of the Cancer program of a still more practical nature.

This inaugural message gives assurance of support of sound public health measures and those responsible for the practical administration of these important functions will enter upon the year's work confident of support of the Chief Executive of the Commonwealth.

CONFERENCE ON MENTAL HYGIENE

THE attention of our readers is directed to a notice appearing elsewhere in this issue concerning the forthcoming conference on mental hygiene in public health and social work. The three agencies participating are the Boston Council of Social Agencies, the Boston Health League and the Massachusetts Society for Mental Hygiene, and an occasion such as this, when these three vitally connected movements may come to a clearer understanding of their relationship and their opportunities for co-öperation, is of particular import.

The mental hygiene movement, the infant of public health endeavors, has assumed the position of importance which rightfully belongs to it, for the need of its influence is felt in most human activities. It is especially gratifying to know that this joint conference is to take place, and it should be well attended.

THIS WEEK'S ISSUE

CONTAINS articles by the following named authors:

DEAVER, JOHN B. Sc.D., M.D. University of Pennsylvania, 1878. F.A.C.S. Emeritus, John Rhea Barton Professor of Surgery, University of Pennsylvania School of Medicine; Professor of Surgery, Graduate School of Medicine, University of Pennsylvania; Surgeon-in-Chief, Lankenau Hospital, Philadelphia. His subject is "Gallbladder Disease." Page 159. Address: 1830 DeLancey Place, Philadelphia, Pa.

AYCOCK, WILLIAM LLOYD. M.D. University of Louisville School of Medicine 1914. Assistant Professor, Preventive Medicine and Hygiene, Harvard Medical School. Director Research Laboratory, Vermont Department of Public Health. Member, Harvard Infantile Paralysis Commission. Address: Harvard Medical School, Boston. Associated with him is:

LUTHER, ELIOT H. M.D. Harvard, 1921. Instructor in Preventive Medicine and Hygiene and Assistant in Pediatrics, Harvard Medical School. Epidemiologist in Poliomyelitis for Massachusetts State Department of Public Health. Their subject is: "The Occurrence of Poliomyelitis Following Tonsillectomy." Page 164. Address: Harvard Medical School, Boston.

STRANG, JAMES M. B.S., M.D. Harvard, 1925. Assistant Attending Physician, Western Pennsylvania Hospital. His subject is: "The Variations of Blood Pressure in the Extremities." Page 167. Address: 805 Highland Building, Pittsburgh, Pa.

DRURY, DANA W. M.D. Harvard, 1904. F.A.C.S. Surgeon of Oto-Laryngology, Massachusetts Eye and Ear Infirmary, Massachusetts General Hospital. Fellow, American Otological Society and American Laryngological, Rhinological and Otological Society, Inc. His subject is: "Syndrome-Complex, Meniere." Page 173. Address: 416 Marlborough Street, Boston.

LAMB, HENRY W. A.B., M.D. Johns Hopkins 1924. House Officer, Boston City Hospital, 1924-1925. Assistant Orthopedic Surgeon, The Children's Hospital, Portland, Maine, and Maine General Hospital, Portland Maine. His subject

is: "Operative Lengthening of the Femur." Page 179. Address: 131 State Street, Portland, Maine.

EDDY, STANTON S. A.B., M.D. University of Vermont, 1897. Formerly President, Vermont Medical Society. Surgeon, Rutland Railroad. Member of Vermont State Board of Medical Registration. Health Officer, Town of Middlebury. Chairman of Medical Board, Porter Memorial Hospital, Middlebury, Vermont. Surgeon, Vermont Marble Company. His subject is: "Medicine's Search for the Fundamental Causes of Disease." Page 183. Address: Middlebury, Vermont.

PALMER, ROBERT S. M.D. Harvard, 1925, and SPRAGUE, HOWARD. A.B., M.D. Harvard, 1922, continue their presentation of "A Cardiovascular Review." (See page 71, issue of January 10 and page 128, issue of January 17). Additional information regarding the authors appears on page 94, issue of January 10. This week's contribution begins on page 188.

COMPULSORY VACCINATION OF SCHOOL CHILDREN

ON Monday, February 4th, at about 11 A. M., the Legislative Committee on Public Health will hold a hearing on House 202. This bill would do away with the existing discrimination between children attending public and private schools in regard to vaccination against smallpox. For over twelve years Dr. Samuel B. Woodward has devoted himself unsparingly to safeguarding the public health in this matter. Under his leadership the efforts to break down our present inadequate law have been frustrated and there is every reason to hope that this year our laws will be strengthened. No new principle is proposed. All which is asked is that children in private schools shall be vaccinated as those attending public schools must be at present. The purpose is to prevent a group of children from growing up to be a menace to the Commonwealth in later life.

This bill, which seems wholly reasonable to educated physicians and laymen, which is endorsed by the presidents of every college but one in the State, by the heads of private schools, by the Boards of Health and Chambers of Commerce of the large cities of the State, has been opposed by a very active group of sincere individuals who for the most part are opposed in general to medical progress. During recent years the opponents of vaccination have forwarded over two thousand letters to the Committee on Public Health, while none or at most only a handful have come from those who wish to safeguard the Commonwealth.

As long as Legislators are chosen by popular vote many will be influenced by popular clamor. If the physicians of the State wish to help Dr. Woodward and the Joint Committee on Legislation they can give great aid by writing to or interviewing their Senators. The JOURNAL has already published a list of those elected to the Legislature. If, however, any individual does not know the name of his Senator he may write to Senator Warren C. Daggett, Chairman of the Committee on Public Health, State House, Boston. Will *you* please do your bit and do it now?

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THE COMMON COLD OR CORYZA

SYDENHAM somewhere says that "more people die of colds than of the Pestilence". Washington died of an abscess in his larynx that probably would have been cured had there been any instruments known or technique practiced that would have enabled his physicians to diagnose and treat his trouble. Some feel that cooling of the body is a sufficient cause for the incidence of colds though there seems to be no scientific proof that this is so. It appears reasonable, however, even in the absence of scientific proof, that wide variations from the normal conditions under which bodily temperature is maintained must have some influence upon the heat regulating mechanism of the body. We know that metabolism varies with the heat of summer and the cold of winter and we know that the skin is a radiating surface of great importance in the maintenance of heat equilibrium. It is a matter of common observation that the "common cold" has its greatest incidence at the periods of seasonal change from fall to winter, summer to fall and from winter to spring. Certainly such observations must be of significance. The behaviour of one's circulatory mechanism is not unlike that of a hot water heating system. When it is cold out of doors the radiation of the heat outside the house makes necessary a hotter fire to keep up the temperature in the radiators. If there is no automatic regulator in the house the cooled water in the radiators returns to the heater cooler than when it left and tends to cool the water then in the coils so that it goes out again at a lower temperature than it would if there were some regulatory apparatus that would open up the drafts and increase the supply of heat. It is precisely this that the skin does for the blood stream. Cooling its surface cools the blood in its capillary circulation but at the same time if the cold is not too great or too quickly applied, the supply is increased and the rate of flow speeded up so that the degree of heat loss is not too rapid. For this reason a dip in ice cold water does not produce a "cold" in a healthy individual, whereas exposure to a draft, or even without a draft, exposure of a considerable part of the skin surface to the cool air of the room at night may result in such heat losses, if the exposure is prolonged, as to produce a cold, even in a healthy person, for under such circumstances the regulation of heat production and radiation is seriously disturbed.

This would be roughly the point of view of those who regard the "common cold" as caused by temperature variations alone. To those who espouse the infectious nature of "colds", these physiological reactions in the heat regulating mechanism are only of importance in that they "set the stage" for the activity of the ever present infective organisms. Some go even farther and maintain that the right sort of vitamin cannot be had from the food used in winter and that the lack of sunlight in the four winter months is responsible for the lack of vitamin in the food and "colds" result from such impoverishment of the food supply.

A considerable amount of bacteriologic study has been undertaken on the subject of the "common cold" and though there are a few organisms that play important rôles in late developments or complications of a "cold," the specific organism responsible for its incidence does not seem to have been discovered. Certain authors have tried to pin the onus of incidence upon anaerobic, non-filterable organisms found in the respiratory tracts but this work has not been confirmed. There is a large bacterial flora in the upper air passages but they seem to be normal inhabitants. Still another slant on the incidence of respiratory trouble in children of school age is presented in a report from a New York private school where the only relationship between enforced absences from school on account of the symptoms of a "cold" was related to the amount of the carbohydrate food which was taken. The facts seem to be that so far no one appears to have satisfactorily answered the questions as to what is the etiology of the "cold" and how it may best be prevented or treated. There is much to support the bacteriologic hypothesis. There are, however, numerous clinical facts that seem to bear no relation whatever to bacteriology. Our manner of dressing, the overheated state of most of our dwellings, offices, etc., doubtless tend to keep our resistance down if they are not the underlying reasons for the incidence of the "cold". In view of what can be derived from it there can be no question that the public should be educated to pay more attention to it. If they cannot be educated to view it in a light which takes into consideration the rights and interests of others it should be made subject to control by the authorities of the State or Municipality.

The various views and the arguments which are used to support them have found their way into medical literature and some parts of this literature will be available to users of the Library, in Holmes Hall for the fortnight beginning January 25, 1929.

WHAT IS PASTEURIZED MILK?

Definition. Pasteurized milk is defined by state law as milk heated to 140°-145° F. for thirty minutes.

Object. The only object of pasteurization is to destroy the disease germs which are sometimes found in milk.

Milk-Borne Diseases. The following diseases are known to be milk-borne: tuberculosis, typhoid fever, scarlet fever, diphtheria, septic sore throat, foot-and-mouth disease, dysentery, and other intestinal troubles, especially in infants. To this long list has recently been added epidemic arthritic erythema and undulant fever. Three small outbreaks of infantile paralysis have been traced to raw milk.

In the last twenty years over six hundred milk-borne epidemics have been reported in this country. Who can say how many have occurred unrecognized!

Pasteurization spells protection so far as these diseases are concerned.

Official Supervision. Our regulations provide ample authority to insure adequate pasteurization. They also safeguard the cleanliness of milk before pasteurization. Both the local and state health authorities are responsible for the enforcement of our pasteurization laws.

Inspection. Milk should be inspected even though pasteurized. Pasteurization does not remove the need of sound cows, healthy milkers and clean dairy methods. Milk is subject to official inspection from pasture to pail and from pail to palate. Through inspection our supply is steadily improving. Inspection provides for cleaner, fresher and better milk, but not necessarily safe milk. Raw milk, however carefully handled, has frequently caused disease. THERE IS NO RECORD OF MILK-BORNE EPIDEMIC DUE TO PROPERLY PASTEURIZED MILK.

Digestibility. Pasteurized milk is quite as digestible as raw milk; in fact, the heat of pasteurization produces no appreciable physical or chemical change. Pasteurized milk is quite as nourishing.

Pasteurization and the Vitamines. Pasteurized milk is a good source of some of our vitamines. Whether milk for infants is raw or pasteurized it should be supplemented with orange or tomato juice to prevent scurvy, and sunshine and cod liver oil to prevent rickets. There can be no more objection to the heating of milk than there is to the cooking of meat.

Pasteurization is the simplest, cheapest and most effective way of giving you and your family protection of your most important single food product. PASTEURIZATION SAVES LIVES AND PREVENTS SICKNESS.

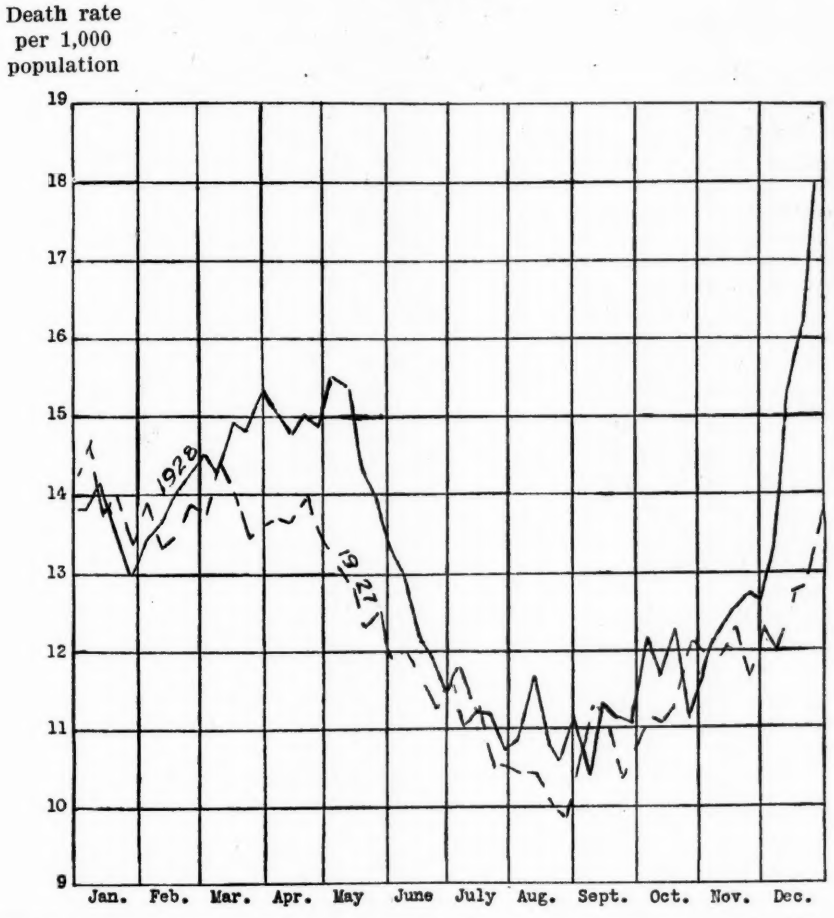
BY MILTON J. ROSENAU, M.D.,
Professor of Preventive Medicine and Hygiene, Harvard Medical School.

MISCELLANY

WEEKLY HEALTH INDEX

Mortality Rates of Cities Reporting 1927 and 1928

(Annual Basis)



The Department of Commerce is publishing each week the Census mortality reports from the largest cities of the United States.

There are given for each city, the total number of deaths reported (stillbirths excluded), the death rate (annual basis), the number of deaths under one year of age, and the annual infant mortality rate based on deaths under one year for the week and estimated births for the previous calendar year.

Data for the corresponding week of the previous year are given for each city and also for comparison the infant mortality rate for 1926.

RÉSUMÉ OF COMMUNICABLE DISEASES IN MASSACHUSETTS

DECEMBER, 1928

GENERAL PREVALENCE

The total reported incidence of communicable diseases for December was within endemic limits, although measles and influenza ran a high incidence.

The reported incidence of anterior poliomyelitis, diphtheria, scarlet fever, pulmonary tuberculosis and whooping cough was within endemic limits.

The reported incidence of non-pulmonary tuberculosis was low.

A new low December record was reached in the incidence of typhoid fever, twelve cases being reported, or, fifty-two per cent. less cases than in December, 1927.

RARE DISEASES

Anterior Poliomyelitis was reported from Boston, 3; Cambridge, 1; Framingham, 1; Gloucester, 1; Lowell, 1; New Bedford, 1; Somerville, 1; Wakefield, 1; total, 10.

Dysentery was reported from Boston, 1; total, 1.

Encephalitis lethargica was reported from Boston, 3; Lowell, 1; Lynn, 1; Marlboro, 1; Somerville, 1; Waltham, 1; Wellesley, 1; Worcester, 3; total, 12.

Epidemic cerebrospinal meningitis was reported from Chelsea, 1; Fall River, 1; Greenfield, 1; Lawrence, 1; Lowell, 2; Peabody, 1; Springfield, 1; Wellesley, 1; total, 9.

Pellagra was reported from Boston, 1; total, 1.

Septic sore throat was reported from Beverly, 2; Boston, 9; Everett, 1; Fall River, 1; Lowell, 1; Lynn,

1; New Bedford, 1; Prescott, 1; Williamstown, 5; total, 22.

Smallpox was reported from Gardner, 4; Springfield, 1; Weymouth, 1; total, 6.

Tetanus was reported from Lawrence, 1; total, 1.

Trachoma was reported from Boston, 2; Lawrence, 1; total, 3.

MONTHLY REPORT OF CERTAIN COMMUNICABLE DISEASES

DISEASE	Cases in Entire Population Dec. 1928	Dec. 1927	Prosodemic Index	Epidemic Index	Case Rates per 100,000 pop. Dec. 1928	Dec. 1927	Expected Rate ***
ALL CAUSES	9255	8508	-	-	214.0	199.3	-
Ant. Poliomyelitis	10	65	20	.5	.2	1.5	.5
Diphtheria	483	590	610	.8	11.2	13.8	14.1
Measles	2755	2552	1745	1.6	63.5	59.6	40.3
Pneumonia, Lobar	550	471	435	1.3	12.7	11.0	10.1
Scarlet Fever	1040	1217	1177	.9	24.0	28.4	27.2
Tuberculosis, Pul.	372	326	303	1.2	8.6	7.6	7.0
Typhoid Fever	12	25	23	.5	.3	.6	.5
Whooping Cough	590	755	882	.7	13.6	17.7	20.4
Chicken Pox	1564	1045	-	-	36.2	24.4	-
German Measles	37	61	-	-	.9	1.4	-
Influenza	478	42	-	-	11.0	1.0	-
Mumps	306	590	-	-	7.1	13.8	-
Tuberculosis, O.F.	48	60	-	-	1.1	1.4	-

Prosodemic Index

This Index is an attempt to estimate the number of cases based on the trend during the past years which can be expected to occur, and is for the purpose of comparison with the number of cases which actually did occur.

Epidemic Index

This ratio expresses how prevalent the disease is compared with the index mentioned above; 1.0 indicates that the actual number of cases equals the expected number. A larger number means a greater prevalence, and a smaller number a lesser prevalence than expected. Thus, 2.0 would indicate twice the expected number of cases, and .5 half the expected number of cases. The method used to determine the indices is described in the August 18, 1927, issue of the BOSTON MEDICAL AND SURGICAL JOURNAL.

***Calculated from the Prosodemic Index.

UNITED STATES PUBLIC HEALTH SERVICE

CHANGES OF DUTIES AND STATIONS OF COMMISSIONED OFFICERS OF THE UNITED STATES PUBLIC HEALTH SERVICE IN NEW ENGLAND

JANUARY 9, 1929

Surgeon Louis Schwartz. Directed to proceed from New York, N. Y., to Bristol, Conn., and return, in connection with industrial hygiene studies. Jan. 2, 1929.

P. A. Surgeon Albert E. Russell. Directed to proceed from Niagara Falls, N. Y., to Boston, Mass., and return, to present a paper before a meeting of the Massachusetts Safety Council on January 10, 1929. Jan. 5, 1929.

Assistant Surgeon D. A. Hoxie. Directed to proceed from Ellis Island, N. Y., to Concord, N. H., and return, to accompany patient to New Hampshire State Hospital, at Concord. Jan. 5, 1929.

Sanitary Engineer Leslie C. Frank. Directed to proceed from Washington, D. C., to Worcester, Mass., and return, to attend the meeting of the Massachusetts Milk Inspectors Association on January 9 to 11, 1929. Jan. 5, 1929.

THE EFFECT OF COMMUNICABLE DISEASES ON GOITER IN CHILDREN

The United States Public Health Service has recently announced the results of investigations dealing with the effect of such communicable diseases as relate to goiter. These studies reveal the following:

1. Thyroid examinations of 589 boys and 636 girls were made before and after communicable illnesses. After the illness no changes in thyroid size were detectable among 51.7 per cent. of the boys and 45.6 per cent. of the girls. Thyroid size was decreased in 13.8 per cent. of the boys and 11 per cent. of the girls. Increased size was noted among 34.5 per cent. of the boys and 43.4 per cent. of the girls.

2. The thyroids of 1,842 boys and 1,783 girls who did not have communicable illness in the interval were examined one year apart. No change in thyroid size had taken place among 48.4 per cent. of the boys and 43.6 per cent. of the girls. Thyroid size had decreased in 12.7 per cent. of the boys and 18.6 per cent. of the girls, while an increase was recorded among 38.8 per cent. of the boys and 35.7 per cent. of the girls.

3. A communicable disease census of 7,977 boys and 8,441 girls showed little difference in percentage incidence among the thyroid normal and thyroid enlarged children who had the same maladies.

There is some evidence to show that one of the immediate effects of communicable diseases among girls of elementary school age is a simple enlargement of the thyroid gland. However, this thyroid enlargement appears to be temporary in character. A comparatively short time, the length of which is yet undetermined, after a child recovers from a communicable disease, he is no more prone to changes in thyroid size than a child who has not had a communicable disease.

In so far as elementary school children are concerned, there appears to be no ground for assuming that the ordinary communicable diseases are responsible for simple goiter. The underlying causes of this malady must be sought for in other directions.

CORRESPONDENCE

THE TREATMENT OF INFLUENZA

January 13, 1929.

Editor N. E. JOURNAL OF MEDICINE:

Permit me to say a few words about the treatment of influenza-pneumonia that I have found useful in my own practice.

It consists of the following: HI 10% solution, 3IV to 3VIII in a 4 ounce solution and Ammonium Mur. 3I to 3II in a 4 ounce solution. A teaspoonful of the HI solution is alternated hourly with a teaspoonful of the Ammonium Mur. solution while the patient is awake. In severe cases instead of the HI solution I use a saturated solution of KI in doses of 20 to 40 drops every 2 hours, similarly alternated with the Ammonium solution.

My object in using the Iodine and Ammonium jointly in this manner is to favor resolution by the former and absorption by the latter. In addition, the Iodine seems to have some anti-toxic property.

In favorable cases the temperature drops to about 100° F. on the second or third day, coinciding with improvement in the patient's general condition. In 3 to 4 more days the temperature drops to normal and the patient quickly convalesces.

Furthermore, I insist that the patient does not leave his bed for any purpose whatsoever until he is fully convalescing, as I feel that no treatment in pneumonia can be successful unless this order is strictly obeyed.

Similarly, in cases of severe bronchitis that seem to be heading for pneumonia I have found that the same line of treatment has generally prevented its development.

Having tried this treatment successfully for several years I strongly recommend it to others confronted with the same problems.

Very truly yours,

SAMUEL W. MYERS, M.D.

CORRECTING A MISTAKE

Editor, NEW ENGLAND JOURNAL OF MEDICINE,

Dear Sir:

In my letter to you on Jan. 5, 1929 concerning the annual registration of physicians and registration of Class C graduates, and which appeared in the Jan. 10, 1929 issue on Page 98, I wish to state that by altering some of my wording, you have failed to give the readers just what I intended.

I stated: ". . . and have been licensed to practice medicine and surgery by the University of the State of New York upon an examination back in 1909. . . .". You have changed this to read: ". . . and have been licensed to practice medicine and surgery, after graduating from the University of the State of New York, upon an examination back in 1909."

For your information I wish to state that the University of the State of New York is NOT an educational institution, but the name under which the Regents or medical examiners of the state of New York license practitioners. It is equivalent to the Board of Registration in our state. My certificate of license which I obtained reads: "The University of the State of New York . . . and found duly qualified to receive this license to practice medicine and surgery in the State of New York. In witness whereof the Regents grant this license no. 9691 under the seal of the University at the capitol in Albany, June 25, 1909. . . ."

To make this story complete, may I add that I was graduated from Columbia University, College of Physicians and Surgeons in the City of New York in 1902?

Sincerely yours,

MAX BAFF, M.D.

Worcester, Jan. 15, 1929.

A NOTE ON STATUS THYMICO-LYMPHATICUS

January 14, 1929.

Editor, NEW ENGLAND JOURNAL OF MEDICINE,

Would you kindly publish this note bearing upon matter presented in the article "Some Side Lights on the Thymus Vogue", published in the current number (Jan. 10) of the JOURNAL.

In 1913, Prof. Wiesel, of Vienna, published his finding that in status thymico-lymphaticus there is present a hypoplasia of chromaffin tissue—the tissue that produces adrenalin. Relative to this research, Charles McNeil wrote in the *Edinburgh Medical Journal* (Vol. 12, p. 29): "The statement of Wiesel that in a case of status lymphaticus with sudden death the adrenal medulla showed almost complete absence of chromaffin staining (with bichromate salts) has been confirmed by the observations Hedinger, Hart, Bartel, Warthin, and others. It is an important addition to the pathological findings as described by Paultauf; and Wiesel has founded on it the interpretation that the sudden death in status lymphaticus is an adrenal death, and is due to a sudden fall in the blood pressure produced by a temporary exhaustion of the deficient adrenal secretion. Suprarenal hypoplasia has established a place in the pathology of status lymphaticus."

Because of its importance, it would appear that Wiesel's findings ought to be tested in Boston's cases of death in which status thymico-lymphaticus is considered as cause.

In life, when an enlarged thymus, or other consideration, causes a suspicion of the presence of status thymico-lymphaticus, it would be a wise precaution before operating upon such, to safeguard the supply of adrenalin by a good dose of it injected subcutaneously.

Yours truly,

EDWARD A. TRACY, M.D.

RECENT DEATHS

LE BOEUF—DR. ALFRED THOMAS LE BOEUF, a practitioner of eye, ear, nose and throat work, of Salem, died of influenza at his home in that city, January 18, 1929, aged 46.

He was a native of Ashland, the son of Thomas and Emma Parish Le Boeuf, and moved to Worcester at the age of five. He took his M.D. at the Baltimore Medical College in 1908, spent a year as interne at the Maryland General Hospital, and settled in Salem, the following year, and joined the state medical society in 1909. Dr. Le Boeuf was on the staff of the Salem Hospital and was a member of the Salem Lodge of Elks, the Kiwanis Club, Salem Y. M. C. A. and the Salem Country Club.

He is survived by his widow, who was Emina L. Nadeau, and by five children.

SHANAHAN—Dr. Thomas Joseph Shanahan, of Brookline, died at his home in that town, January 17, 1929, aged 55 years.

He was a native of Lawrence and received his education in the Lawrence high school and at Harvard Medical School, receiving his M.D. in 1896. He settled in Brookline and joined the state medical society, later becoming a Fellow of the American Medical Association. He was examining physician for St. Lawrence Court, M. C. O. F., and Brookline Council, K. of C. He was also a member of the Brookline Lodge of Elks. He is survived by his widow, who was Miss Margaret Gagin, of Stirling, Illinois, and by one daughter.

OBITUARY

RESOLUTIONS ON THE DEATH OF CHARLES MONTRAVILLE GREEN, M.D.

At a meeting of the Gynaecological and Obstetrical Staff of the Boston City Hospital, held December 11, 1928, the following resolutions were adopted.

The announcement of the death of Dr. Charles Montraville Green brings to us a feeling of irreparable loss.

He was a member of the hospital staff for forty-four years and this period is coincident with the great and constant advance of the institution he so ably served. In 1884 he was appointed physician for diseases of women in the out-patient department of the Boston City Hospital; in 1893, assistant visiting physician; in 1896, visiting physician; in 1900, senior visiting physician in charge of the department. From 1907 to 1914 he served as president of the Senior Staff and chairman of the Executive Committee. In 1914 he resigned, and was appointed to the honorary position of Senior Surgeon for Gynaecology and Obstetrics.

Dr. Green's humanity made him greatly beloved, and he endeared himself to his patients to an unusual degree. His breadth of knowledge and sagacious judgment made his presence essential at all hospital councils.

His unswerving adherence to the path of rectitude in the conduct of the affairs of the hospital and his own department created an eminent example for his colleagues to emulate. The staff of which he was the chief was composed of men who first as his eager students and later as his admiring comrades and zealous disciples formed a company in whose association he felt great pride and enjoyed much happiness.

To his family we extend our heart-felt sympathy in their great bereavement and are confident that their sorrow will be mitigated by the remembrance of the nobility of his life.

Similar resolutions were adopted at a meeting of the members of the Obstetrical Society of Boston held January 15, 1929.

NEWS ITEM

PROFESSOR POLL OF HAMBURG, GERMANY, LECTURES AT HARVARD MEDICAL SCHOOL—Dr. Heinrich Poll, Director of the Anatomical Institute, Hamburg University, lectured at the Harvard Medical School on Tuesday, January 8, 1929. His subject was "Adrenalin, Insulin, and Sexhormone from the Viewpoint of Their Inter-relationships". Dr. Bremer presided.

NOTICE

UNITED STATES CIVIL SERVICE EXAMINATIONS

The United States Civil Service Commission announces the following open competitive examinations:

Inspector, Antinarcotic Act, $2,300 to $2,800 a Year

Agent, Antinarcotic Act, $2,300 to $2,800 a Year

Applications for the positions named above must be on file with the Civil Service Commission at Washington, D. C., not later than February 19.

REPORTS AND NOTICES OF MEETINGS

HARVARD MEDICAL SOCIETY

The Harvard Medical Society held a regular meeting on Tuesday evening, January 8, 1929 in the Peter Bent Brigham Hospital Amphitheatre. After the presentation of cases Dr. Henry S. Houghton, Dean of the College of Medicine, State University of Iowa, who has recently spent some time in China, during which time he was particularly interested in the old regime of Chinese medicine, spoke on "The Ancient System of Chinese Medicine." Dr. Harvey Cushing presided.

The first case was presented by Dr. Strayhorn of the Medical Service. The patient was a 35-year-old white male cook who entered the hospital on Dec. 25, 1928 in a convulsive seizure of one hour's duration. Past history revealed that he had had occasional attacks of tonsillitis and had suffered from severe headaches from the age of 16. These headaches had been worse in the past two months. The morning of the onset the patient felt about as well as usual. His wife, hearing a noise in the kitchen, found him lying unconscious and immobile on the floor. He was cyanotic, had vomited and been incontinent of feces and urine. He responded to nothing and was brought to the hospital immediately. P. E. showed a well-nourished man with choreiform movements of upper extremities and trunk with flaccid lower extremities. He was incontinent of urine and feces. Reflexes were hyperactive and well-sustained ankle clonus on the left side was found. External ocular movements were normal, but ophthalmoscopic examination showed subhyaloid and a retinal hemorrhage more in the left eye. Morphine was given and the patient after two hours of quiet improved steadily. The following day signs of meningeal irritation indicated a lumbar puncture which yielded 12 cc. of bloody fluid under increased pressure. Three lumbar punctures were done at 48 hr. intervals and each time relieved the headache. The findings were similar. The clinical pathology except a white count of 17000 was negative. Wassermann was negative. The case was shown in relation to two other cases recently in the hospital which showed the same signs and symptoms. One of these at autopsy revealed a mycotic aneurysm of the basilar artery.

The second case was presented by Dr. Sagebiel of the Surgical Service. A 35-year-old Russian raincoat cementer entered with a complaint of pain in the right leg. A year before August, 1928, he had had recurring vague pains over his upper right tibia. In August when walking out of the water after swimming, he fell down and subsequent x-ray examination

showed a pathological fracture of the upper right tibia. P. E. in the hospital was negative except for a swollen tense discolored right leg without abnormal mobility or crepitus. The x-ray diagnosis was rarefying osteitis. A plaster cast was applied from foot to thigh for six weeks. Six weeks after removal of the cast he had recurring pain and two weeks later than this x-ray showed a second fracture 7 cm. below the first one which was healing well, but the absorptive process was spreading. A biopsy was done and the wound healed well. There was disagreement as to the pathology, some calling it chronic inflammation with scar tissue formation and others calling it a low-grade sarcoma. Dr. Wolbach named it proliferative destructive osteitis. Since Paget's disease sometimes begins this way, x-ray examination of the skull and long bones was done and was negative. The clinical pathology, Wassermann, and Hinton tests all were negative.

The general idea of Western peoples, said Dr. Houghton, is that Orientals are "opaque" to our understanding, that his customs are inverted, that his manners are queer. It is only by a better knowledge of them that the Westerners can realize that the Oriental peoples are quite similar.

Chinese medicine is thousands of years old. One ancient emperor classified 366 herbs by taste as good, medium, or poor. In 2700 B. C. another emperor gave the canon of medicine which has been used as the basis for all medicine. In it are many interesting things; for instance, the circulation of blood was suggested. What was lacking was anatomical knowledge. But medicine was listed as one of the nine law trades. Later on and even now in the higher classes medicine is not looked upon as one of the higher callings.

About the end of the second century lived the man, Chong Ching Chang, who is called the Hippocrates of Chinese medicine. His best work is "A Treatise on Typhoid Fever," in sixteen volumes. In the ten volumes which remain to us there are twenty-two essays describing the treatment of typhoid and other fevers. His teachings are not only the earliest records of bedside treatment and observation, but are strikingly modern, including enemata, hydrotherapy, and antipyretics. He said that the physician should have a "square character, rounded knowledge, a small heart (caution), and a large gall-bladder (courage)." The medicine of his time was similar to that of the 16th century in Europe, except for a few outstanding differences: first, the profession in Europe co-öperated more, were more unified; it was more separated from the sacerdotal influences; in Europe it was a learned profession nearly always being connected with the universities, while in China medicine was secondary, a business frankly.

The method today in China when a person is sick is to have many doctors,—the wealthier the family, the more doctors. Each doctor without consultation looks at the patient and hands in a prescription. The family decides which treatment to take. Since prescriptions are secret and hereditary, the greater number of progenitors a doctor can claim, the more faith the people have in his prescriptions. The Chinese have great faith in Western surgery, but little in its medicine.

The valuable contributions we can derive from Chinese medicine, Dr. Houghton pointed out, are new ideas about drugs. It seems improbable on the basis of empiricism that so shrewd a people would continue to use a drug which has not proved of some worth. Chinese drugs may be classified as (1) those known to both Western and Eastern pharmacopeias; (2) those in Chinese books related to those in the Western pharmacopeias; (3) some known and not used by the West; (4) some discarded by the West; and (5) some unknown to the West. From the last group, surely, must come some drugs of use. Already ephedrin has been given to the West and is now used extensively. The field is open and should be investigated thoroughly.

THE MEETING OF THE R. C. R. C.

This medical club met in the Harvard Club January 7, 1929 and after a social hour the President, Dr. Harvey Towle, called the meeting to order and introduced Dr. Harlow Brooks of New York who delivered a scientific and practical address on Angina Pectoris.

He based his study of this subject on 350 consecutive cases and explained that certain differences in the conclusions of various writers may be explained by the character of the clientele in a given study. The term angina pectoris is not applicable to a disease but rather to the syndrome by which attention is called to the underlying diseased conditions which result from perverted physiologic condition and the treatment varies according to the pathologic lesions which bring about the symptom complex.

He found that males are more subject to the disease than females because of the greater physical and psychic demands incident to men's occupations, but under existing conditions since women's duties and activities are approximating those of men there seems to be an increasing incidence of this disease among females. The especially significant etiologic factors are, aside from the occupational influence, heredity, syphilis and vascular diseases. Families with transmitted tendencies to disease of the blood vessels are known to be more prone to exhibit cases of angina, so that there are recognized angina families as there are cardiorenal families, apoplectic families, etc. Business men are especially prone to angina (93 in this series) whereas only 31 were in the learned classes, 60 among executives, but artists are favored as shown by only 15. People engaged in open air occupations were not especially liable as shown by 19 cases.

A study of races shows that few colored people have angina. This holds true of Indians although in advanced life they exhibit classical forms of arteriosclerosis. Hebrews show a relatively larger number than other races. The common idea that angina is associated with hypertension has not been significant in the series studied for there were 96 with hypertension and 64 with hypotension and 200 with normal tension. Angina is rare in youth, the ages between 50 and 60 showing the larger number of cases. From the etiologic standpoint infections seem to bear an important relation. In this series diabetes was encountered in 15 cases contrary to the numerical ratios as reported by some observers. The various toxemias were not found to have been especially important as causative factors and, although any excitant of the nervous and circulatory system may precipitate an attack, neither tea, cof-

fee, tobacco nor alcohol seem to play an important etiologic rôle, per contra as far as alcohol is concerned it may be very useful in promoting euphoria.

Although dietary indiscretions are regarded as important, the speaker felt that quantity of food might be important in precipitating attacks.

The influence of syphilis is not as general as has been claimed but, if it is found to exist in a given case, treatment may be expected to be of great benefit.

The cause of death in angina is usually coronary thrombosis although the great pain may in and of itself produce death by shock affecting the sympathetic system. This is an important although not the usual direct cause of death. The chief lesions found in this series were coronary disease, general arterial disease, hypertrophied and hypoplastic hearts, aortitis and myocarditis.

The duration of conditions causing attacks varies, some cases showing the symptoms of angina for 20 years. The prognosis should be guarded and care taken not to frighten patients because apprehension may be so augmented by discouraging opinions that death may follow earlier than is necessary.

The difficulty of differentiating pseudo and true angina was referred to and although the electrographic findings are significant they are not infallible.

The treatment should be adjusted to the requirements of the individual. Many can continue restricted activities and others may need to go to bed for weeks. Syphilitic, gouty, and rheumatic cases may improve under appropriate treatment. The exciting cause must be eliminated and nitrites must be used at the earliest approach of an attack. Sedatives may be indicated except in those cases when there is a falling blood pressure during sleep. Alcohol is of value in many cases especially at night unless the attacks come on during sleep due to association with lowered blood pressure. Certain cases are helped by caffein and strychnina and vasodilators have a very definite prophylactic influence.

It is unfortunate that those who were not privileged to hear this scientific and practical exposition of angina pectoris have to depend on an abstract. The address was discussed by Drs. Robey, Pratt, Greenwood and others.

The second paper of the evening was read by Dr. A. V. VanBibber of Bel Air, Maryland who gave a very interesting account of the lives of physicians of the region where he lives presenting humorous and pathetic occurrences which explained the reaction of the doctors and patients to each other.

Dr. VanBibber has been previously brought to the notice of Boston doctors by an appreciative notice by the late Dr. F. C. Shattuck in the NEW ENGLAND JOURNAL OF MEDICINE. This was inspired by reading a paper in *The American Mercury* in the issue of August 1928 in which the trials, triumphs and satisfaction incident to the practice of a country doctor were set forth by Dr. VanBibber. His paper of the evening was supplementary to the one published in *The American Mercury* with additions of records of achievements and experience of doctors more especially of interest to professional men.

The paper proved so inspiring that a general experience meeting followed. It was participated in by many of those present.

Dr. VanBibber will be sure of popular recognition if he will continue to write for publication.

MASSACHUSETTS GENERAL HOSPITAL

A staff meeting was held at the Massachusetts General Hospital on the evening of January 10. The program was given by the newly organized clinic in charge of the circulatory disease of the extremities. Dr. Arthur W. Allen outlined the purposes in view in the organization of this clinic and spoke of some of the immediate lines of treatment to be carried out.

Dr. L. Parsons, junior house-officer on the West Surgical Service, demonstrated the first case. The patient was a man with a chronic ulcer near the base of the great toe which has proved very resistant to all forms of treatment. The patient suffered so much from pain in the foot that amputation had been considered. It had, however, been decided to try first blocking the nerves to the foot with alcohol. Following this treatment the patient had experienced complete relief from pain, and at the same time there was marked improvement in the local condition of the ulcer.

The second case was presented by Dr. James C. White. This was an interesting case in which the diagnosis lay between Raynaud's Disease and scleroderma. There was great deformity of the hand, and disability. It was planned to resect certain of the sympathetic ganglion of the thoracic chain, the operation usually being followed by marked improvement in the circulation in this type of case.

The third case was presented by Dr. Arthur W. Allen. The patient was an elderly woman who had entered the hospital about a year ago with an embolus in the femoral artery. Dr. Allen had removed the embolus, the circulation to the extremity had returned, and now, several years later, the woman was in excellent health. Dr. Allen reviewed briefly his experience with embolectomy during the past four or five years.

Dr. R. Smithwick was the next speaker. He described the work in the use of non-specific protein injections in the treatment of various circulatory diseases of the extremities. He reviewed their results, which were in general very encouraging. In a number of the cases the improvement of the circulation and the relief of pain was remarkable. Dr. Smithwick stated that the danger in the use of this treatment was that in the brief period during which the circulation is slowed up following the injection, thrombosis might occur. He said that they hoped to minimize this in the future by keeping the extremities warm with hot packs.

Dr. J. C. White was the next speaker. He reviewed his experiences in Leriche's clinic in Strassburg. He recounted Dr. Leriche's first experiments with a periarterial sympathectomy, and said that this procedure had now largely been given up. Professor Leriche at present devotes most of his attack directly to the sympathetic ganglia or the rami communicantes. Dr. White discussed certain aspects of the anatomy of the sympathetic system and described briefly the results that might be expected from removal of different parts of the sympathetic chain.

The next speaker on the program was Dr. L. S. McKittrick, who talked on the subject of the man-

agement of cases of diabetic gangrene. Dr. McKittrick showed lantern slides of specimens that had been prepared by injecting the arterial circulation to the extremity in different types of diabetic gangrene. Dr. McKittrick stressed the fact that successful treatment could be based only on clear understanding of the circulatory changes back of the areas of gangrene and ulceration. He showed lantern slides of a number of types of circulatory disturbances found in association with diabetes. He particularly stressed the importance of correctly draining the septic areas that arise in connection with the ulcers and the gangrene.

The last speaker on the program was Dr. H. H. Faxon, who talked on the subject of the injection treatment of varicose veins. He spoke briefly of the history of this method of treatment, and said that they were trying out various kinds of solutions in their injections but were inclined to place most reliance on the quinine and urethane mixture. He described the technique of injection and also discussed the pathological process that takes place in the vein following the injection of the irritating solutions. He said that they had been using the method only a relatively short time, but so far were well pleased with the results.

The next staff meeting will be held on Thursday, February 14. This meeting will be given by the Thyroid Clinic.

BOSTON MEDICAL LIBRARY

The Annual Meeting of the Boston Medical Library was held January 15, 1929, at the Library at 8:15 P. M. The president, Dr. Bartol, presided, and twenty-four members were present.

The minutes of the previous meeting and the reports of the Treasurer, Librarian and Executive Committee were read and accepted. The result of the election of officers and members of committees was as follows:

President, Dr. John W. Bartol.

Vice-Presidents, Dr. William N. Bullard, Dr. Homer Gage, Dr. George G. Sears.

Secretary, Dr. Horace Binney.

Treasurer, Dr. Richard G. Wadsworth.

Librarian, Dr. Charles F. Painter.

Executive Comittee, Dr. Herman J. Blumgart, Dr. John W. Cummin, Dr. Lincoln Davis, Dr. William C. Quinby, Dr. Francis M. Rackemann.

Committee on Medical and Social Meetings, Dr. Hilbert F. Day, Chairman; Dr. Alexander S. Begg, Dr. Henry T. Hutchins, Dr. Richard H. Miller, Dr. Maurice Fremont-Smith.

Committee on Membership and Elections, Dr. Gerald Blake, Chairman; Dr. William Breed, Dr. Charles G. Lund, Dr. Donald Macomber, Dr. Hyman Morrison.

It was voted that the annual assessment for the coming year be $15.00.

It was also voted to amend the By-Laws regarding Membership, the new By-Laws limiting the number of Fellows to one thousand and creating four additional classes: Non-Resident Fellows, Members, Student Members and Professional Members. "Members" are any persons not eligible to become Fellows and not medical students or engaged in the profession of medical bibliography. Non-Resident Fellows are physicians residing outside the Greater Boston District. Members pay one-half and Non-Resident Fellows and Student Members one-third the assessment for a Fellow.

Meeting adjourned at 9.30 P. M., after which a very interesting address was delivered by Dr. George S. Bigelow, Massachusetts Commissioner of Public Health, entitled: "Is the State's Cancer Program State Medicine?"

HORACE BINNEY, *Secretary.*

8 The Fenway, Boston, Mass.

NEW ENGLAND ASSOCIATION FOR PHYSICAL THERAPEUTICS ELECTS OFFICERS

At its 217th meeting Jan. 16, 1929 the annual election of officers for the New England Association for Physical Therapeutics resulted as follows:

President, Elisha S. Lewis, M.D., Worcester, Mass.

First Vice-President, Arthur L. Brown, M.D., Winchester, Mass.

Second Vice-President, Philip H. Greeley, M.D., Portsmouth, N. H.

Secretary, G. W. Dickinson, M.D., Winthrop, Mass.

Treasurer, Elmer F. Otis, M.D., Melrose, Mass.

Executive Council, George E. Percy, M.D., Salem, Mass.; Claude L. Payzant, M.D., Medford, Mass.

After the election E. H. Trowbridge, M.D., of Worcester read a paper upon "Some Problems in Gynaecology," which was discussed by the members, and Dr. Ott read an official invitation for the society to join an international congress next summer.

PROF. MARVIN LECTURES TO THE YALE CHAPTER SIGMA XI ON THE ELECTROCARDIOGRAM AND ITS RELATION TO CLINICAL MEDICINE

Professor H. M. Marvin, assistant clinical professor of medicine of the Yale Medical School, addressed the Sigma Xi Society, January 16, 1929, at Stirling Hall of Medicine, and demonstrated the great value in the use of the electrocardiogram method in diagnosing pathological conditions of the heart.

After a statement of the fundamental principals of electrocardiography, and a short description of the string galvanometer, the electrocardiograph, and the technique of operating this instrument, Dr. Marvin showed upon the screen a series of electrocardiograms illustrating specific abnormalities of the heart action.

From this lecture it was evident that this method is of value in all cases as a verification or a supplement to the physical diagnosis, and in such cases as coronary thrombosis and adherent pericardium, where the symptoms are difficult to diagnose, the evidence presented by the electrocardiogram is conclusive. Dr. Marvin concluded with the statement: "No pathological heart has ever been completely studied unless an electrocardiogram has been taken."

LECTURE: PRINCIPLES AND RESULTS OF THE BRITISH SCHEME FOR COMBATTING VENEREAL DISEASES

HARVARD MEDICAL SCHOOL, JANUARY 30, 1929, AT 5 P. M.

Colonel L. W. Harrison, adviser to the British Ministry of Health on venereal diseases, lecturer on venereal diseases at St. Thomas's Hospital Medical School, London, and in charge of the model venereal

diseases clinic at that hospital, will lecture at the Harvard Medical School, Building C amphitheatre, 240 Longwood Avenue, Boston, on Wednesday, January 30, 1929, at five o'clock, on the "Principles and Results of the British Scheme for Combatting Venereal Diseases." The lecture is open to all who are interested.

Colonel Harrison has had a long and distinguished career as an officer of the British Army, and during the War was in charge of the British Army venereal diseases hospitals in France. His research in the field of clinical medicine, especially as related to venereal diseases, has made him the leading authority in this field in Great Britain. Colonel Harrison has represented Great Britain at many international conferences where venereal diseases were scheduled for scientific discussion. In 1919, he represented Great Britain at the Cannes conference when representatives of the Red Cross Societies of the allied and associated powers met to develop a peace-time program for the League of Red Cross Societies; and, in 1921, he represented Great Britain at the original venereal diseases conference held under the auspices of the Red Cross Societies at Copenhagen, and has been one of the medical advisers of the Union Internationale contre le Peril Venerien at various conferences. Recently, he was one of a group of five experts appointed by the League of Nations Health Section to study syphilis from a scientific medical point of view and to initiate certain researches into the clinical problems involved in the treatment of syphilis.

CONFERENCE ON MENTAL HYGIENE IN PUBLIC HEALTH AND SOCIAL WORK

On January 29, 1929, in the Main Dining Hall on the 14th floor of the Chamber of Commerce Building, Boston, there will be held a joint conference on Mental Hygiene in Public Health and Social Work, under the auspices of the Massachusetts Society for Mental Hygiene, the Boston Council of Social Agencies, and the Boston Health League. There will be an afternoon session at 3:30 and an evening session with a dinner at 6:30.

PROGRAM

Afternoon session: 3:30 p. m. C. Macfie Campbell, M.D., Presiding. President, Massachusetts Society for Mental Hygiene, and Director, Boston Psychopathic Hospital.

"The Rôle that Mental Hygiene Plays in School Hygiene," by James S. Plant, M.D. Director, Essex County Juvenile Clinic, Newark, New Jersey.

"The Psychiatric Social Worker and Her Relation to Social Case Work," by Mrs. Eva Whiting White. Director, School of Social Work, Simmons College.

"A Critique of Mental Hygiene," to be announced later.

"The Psychiatric Social Worker's Contribution to Community Nursing," by Miss Marie L. Donohue. Mental Health Supervisor, Community Health Association.

"A Nutrition Worker Looks at Mental Hygiene," by Miss Frances Stern, Chief of the Food Clinic, Boston Dispensary.

Summary of the Afternoon Program, by Mr. Robert Kelso, Executive Secretary, Boston Council of Social Agencies.

Dinner: 6:30 p. m. Followed by the evening session.

George H. Bigelow, M.D., Presiding. Commissioner, Massachusetts Department of Public Health.

"The Significance of Mental Hygiene to Public Health," by C.-E. A. Winslow, Professor, Public Health, Yale School of Medicine.

"What Mental Hygiene Means to Social Work," by Mr. Barry G. Smith. General Director, Commonwealth Fund.

"What Mental Hygiene and Psychiatry Offer the Fields of Public Health and Social Work," by George M. Kline, M.D. Commissioner, Massachusetts Department of Mental Diseases.

MENTAL HYGIENE

Mental Hygiene, a new science, has grown at so rapid a rate as to occupy a vital if not a major position in all programs dealing with social relations. It is the channel for the newer approach to the individual in social case work.

Public Health is the term which designates that educational process by which it is sought through government and unofficial health organizations to instruct and inform the public upon the important aspects of health and its preservation. It involves problems of the education of youth through school systems and by special means; and it includes as well the process of adult education.

Social Work is the exclusive term denoting all processes in the relief of the individual who is dependent, or who is sick, or who is any measurable degree out of adjustment with his social environment. It includes problems of research in the field of social relations in order to determine the factual basis for action. Its aim is the protection of Society at large by the treatment of individuals and groups of individuals in their relations to other persons and other groups.

These three lines of growth are constantly in contact. Their operations in many particulars are duplicating and inclusive; they represent three phases of the same broad process in the service of the common welfare. The time is now ripe for clearer thinking as to their exact relationship. It is to inspire more careful thinking as to their related activities that this program is undertaken.

The three organizations that have united in arranging for this program extend a cordial invitation to all interested in any phase of this subject to attend these sessions.

INTERNATIONAL HOSPITAL CONGRESS

The International Hospital Congress will assemble at Atlantic City, New Jersey, U. S. A., on the morning of June 13, 1929, and will be immediately followed by the annual Convention of the American Hospital Association.

In connection with this first Congress of its kind there will be a very valuable exhibit of plans and models of modern hospitals, of various types of hospital equipment and supplies, and of statistical data relative to the care of the sick throughout the world.

The purpose of the Congress is to bring together all those interested in hospital administration, hospital construction and organization, and to afford

by personal contacts and exchange of ideas a better understanding of hospital needs and problems as well as hospital progress throughout the world.

MASSACHUSETTS TUBERCULOSIS LEAGUE, INC.

The Semi-Annual Meeting of the League will be held at Hotel Statler, Boston, Monday, February 4, at 2:30 p. m.

The speakers at the luncheon preceding the meeting will be Dr. George H. Bigelow, State Commissioner of Public Health of the Commonwealth, and Dr. Edward O. Otis, Honorary President of the League.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The annual meeting of the American Association for the Study of Goiter will be held this year at Dayton, Ohio, on March 25, 26 and 27. The primary object of this association is to bring together each year men who are especially interested in the study of goiter and its associated problems. Members of state and provincial medical societies are eligible and cordially invited to participate as attending members.

The 1928 meeting, which was held at Denver, was a decided success. Professor B. Breitner of the Von Eiselsberg Clinic of Vienna and Dr. Gulbrand Lunde, professor of biochemistry of Oslo, Norway, were the foreign guest speakers. Drs. H. S. Plummer, S. F. Haines, J. deF. Pemberton and William Boothby of the Mayo Clinic held clinics and presented papers. Among the other contributors to the program were W. Blair Mosser of the University of Pennsylvania; W. H. Cole, N. A. Womack and S. M. Gray of Washington University, St. Louis; A. E. Hertzler, Halstead, Kansas; J. L. DeCourcy, Cincinnati; Allen Graham, Cleveland; H. M. Clute of Lahey Clinic, Boston; J. Tate Mason of Mason Clinic, Seattle; and Willard O. and P. K. Thompson of the Massachusetts General Hospital Thyroid Clinic.

The first day of the Dayton meeting will be given over to diagnostic clinics in the morning and several short papers during the afternoon chiefly concerned with recent experimental work. On the second day, operative clinics will be held at the Miami Valley Hospital, St. Elizabeth's Hospital and at the Soldiers' Home Hospital. The afternoon of the second day and the morning and afternoon of the third day will be given over to the presentation and discussion of scientific papers.

The headquarters will be at the Hotel Miami. Dr. William A. Ewing is President of the Montgomery County Medical Society, under whose auspices the meeting is to be held. Dr. E. M. Huston is the General Chairman of the Committee on Arrangements. Dr. H. C. Haning is Chairman of the Hotel Committee. All communications in regard to hotel reservations should be addressed to Dr. Haning at the Reibold Building, Dayton, Ohio.

WORCESTER NORTH DISTRICT MEDICAL SOCIETY

The regular meeting will be held (by invitation) at the Henry Heywood Memorial Hospital, Gardner, on Tuesday, January 29, 1929, at 4 p. m.

Speaker—E. Granville Crabtree, M.D., of Boston.

Subject—"Pyelitis—Its medical and surgical aspects."

J. H. KEARNEY, *President.*
C. H. JENNINGS, *Secretary.*

SOCIETY MEETINGS

Combined Meetings of the Boston Medical Library, the Suffolk District Medical Society, the Middlesex South District Medical Society and the Norfolk District Medical Society (at Boston Medical Library at 8:15)

January 30, 1929—General meeting in association with Boston Medical Library. "Heredity," Professor George H. Parker, Harvard University.

February 27, 1929—Medical Section. "The Newer Knowledge of Nutriment," Dr. Lafayette B. Mendel (exact title to be submitted later), Yale University Medical School.

March 27, 1929—Meeting in association with Middlesex South District Medical Society. Clinical and Experimental Studies of Obstructing Jaundice and Its Complications. Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

The medical profession is cordially invited to attend all these meetings.

January 24—New England Women's Medical Society. Detailed notice appears on page 157, issue of January 17.

January 29—Conference on Mental Hygiene in Public Health and Social Work. Detailed notice appears on page 212.

January 30—Harvard Medical School. Detailed notice appears on page 211, under "Lecture."

February 4—Massachusetts Tuberculosis League. Complete notice appears elsewhere on this page.

March 25, 26, 27—American Association for the Study of Goiter. Detailed notice appears elsewhere on this page.

June 13—International Hospital Congress. Complete notice appears on page 212.

DISTRICT MEDICAL SOCIETIES

Barnstable District Medical Society

Schedule of Meetings: February 7, 1929, May 2, 1929.

Bristol North District Medical Society

April 18, 1929—Spring meeting.

Essex North District Medical Society

May 1, 1929 (Wednesday)—Annual meeting at Lawrence, at 12:30 P. M.

May 2, 1929 (Thursday)—Censors meet at Hotel Bartlett, 95 Main Street, Haverhill, at 2 P. M. (Tel. 3430.)

Essex South District Medical Society

February 6, 1929 (Wednesday)—Council meeting, Boston.

February 13, 1929 (Wednesday)—Danvers State Hospital. Clinic at 4 P. M. Supper at 6 P. M. Speaker: Dr. Roger Lee, Boston; subject to be announced later. Discussion from the floor.

March 6, 1929 (Wednesday)—Lynn Hospital. Clinic at 5 P. M. Dinner at 7 P. M. Symposium on Pneumonia. Speakers: Dr. Reginald Fitz, Diagnosis. Dr. Fred Lord, Treatment. Dr. William H. Robie, Heart in Pneumonia. Discussion from the floor.

RALPH E. STONE, M.D., Secretary.

Franklin District Medical Society

Meetings will be held on the second Tuesday of March and May.

Hampshire District Medical Society

March 13, 1929—Address by Dr. George E. Gage, Professor of Bacteriology and Physiology at the Massachusetts State College.

Middlesex East District Medical Society

The following schedule of meetings has been arranged for the coming year:

March—Reading.
May—Melrose.

Subjects and speakers to be arranged by committees in each city or town.

Middlesex North Medical Society

The winter meeting will be held the last Wednesday in January.

The annual meeting will be held the last Wednesday in April.

Middlesex South District Medical Society

March 27, 1929—Joint meeting with the Suffolk and Norfolk Districts.

April, 1929—Annual meeting. Definite date to be announced later.

Norfolk District Medical Society

Below are the proposed meetings of the Norfolk District Medical Society for the 1928-29 Season. The schedule below will be adhered to as strictly as possible. The

carrying out of the proposed plan will, of course, depend upon the acceptances of invitations extended to the speakers. Minor changes may be necessary.

January 29—Roxbury Masonic Temple. Subject, Treatment of Varicose Veins by the Injection Method—Dr. E. E. O'Neil. Dr. Homans will open the discussion. Complete notice appears on page 157, issue of January 17.

February 25—Roxbury Masonic Temple. Dr. W. R. Ohler. Subject to be announced. Discussion to be opened by Dr. A. A. Hornor.

March 29 — Roxbury Masonic Temple. Subject and speakers to be announced.

May—Annual meeting program to be announced.

The Censors of the Society meet May 9, 1929, at the Roxbury Masonic Temple, Warren Street, Roxbury, at 4 P. M., for the examination of candidates.

Plymouth District Medical Society

March meeting at the Moore Hospital, Brockton, Mass., March 21st, program to be announced later.

April meeting at the Commercial Club, Brockton, April 18th, at 6 P. M. Annual Oration by Dr. Ralph C. McLeod, Orator; dinner.

Suffolk District Medical Society

March 27, 1929—Meeting in association with Middlesex South District Medical Society. "Clinical and Experimental Studies of Obstructive Jaundice and Its Complications," Dr. Waltman Walters, Mayo Clinic.

April 24, 1929—Annual meeting. Speaker, Dr. Walton Martin, New York City. Title to be announced later.

LINCOLN DAVIS, M.D., President.
ARTHUR H. CROSBIE, M.D., Secretary.

Worcester District Medical Society

February 13, 1929—Worcester State Hospital. Program to be announced.

March 13, 1929—Worcester City Hospital. Dedication of New Nurses' Home. Speaking program to be announced.

April 10, 1929—Grafton State Hospital. Program to be announced.

May 8, 1929—Annual meeting. Worcester Country Club.

Worcester North District Medical Society

January 29, 1929—Complete notice appears on page 213. Annual meeting the fourth Tuesday in April.

BOOK REVIEW

"*A Text-Book of Fractures and Dislocations.*" By KELLOGG SPEED. Lea & Febiger, Philadelphia, 1928. 952 pages.

The second edition of Speed's "Text-Book of Fractures and Dislocations" is a practical work based upon a large personal experience in traumatic surgery. It is a distinct contribution to the subject. The text for the most part is brief and direct. The illustrations are profuse but carefully selected. The number of excellent line tracings of roentgenograms which characterized the first edition has been greatly increased.

It would be well if every practitioner who is contemplating the treatment of fractures would read the first sixty pages of this volume (excepting perhaps the use of the Hodgen splint which is a difficult splint for the beginner). These pages cover the general principles of diagnosis and treatment. They are meaty. Of like character are pages 78-102 on dislocations. The intervening general remarks on operative treatment of fractures are splendid. More detailed descriptions and illustrations of the application of Steinmann pin and tongs for skeletal traction might have been given. The use of fascia lata for the repair of certain fractures has such definite advantages that it cannot be regarded as a "fad" and mention of this method of treatment would have been appropriate in this chapter. Less emphasis on the intramedullary bone graft might have been made.

In the subsequent chapters on fractures of the various bones and dislocations at various joints the general plan of consideration is first of recent and later of old injuries; the anatomy, the surgical landmarks, the types, the causes, mechanism and pathology, the symptoms, the diagnosis, the complications, the methods of closed reduction and retention, the course and treatment after reduction, the methods of open reduction and retention. The anatomical data are pertinent and tersely presented. The fundamental principles of reduction and fixation are clearly stated and sound. That the methods of treatment are at times at variance with those in vogue at other clinics is to be expected, for we all discover only by experience what procedures in our own hands give the best results. Thus in fractures of the clavicle we miss a description of a plaster of paris figure of eight to both shoulders and the back. But on page 227 the desideratum of treatment is clearly stated "to restore the shoulder from its position of displacement downward, forward and inward to its normal level & distance from the neck".

What is aimed at in reduction and retention is clearly stated in each type of fracture and dislocation. The particular method of securing the reduction and of maintaining it matters little providing the method of reduction is intelligent in not increasing the trauma and the maintenance of reduction is not too long continued to jeopardize the function of the contiguous joints. Speed says on page 52, "The inherent value of any apparatus is of less importance than the skill with which it is applied". In impacted or entangled fractures of the neck of the humerus we miss mention of early pendulum and rotatory movements of the arm with increasing abduction. But Speed distinctly states on page 297 the necessity of early abduction.

That part of Chapter Thirteen which deals with fractures of the lower end of the radius, that part of Chapter Fifteen which deals with fractures of the carpus and that part of Chapter Sixteen which deals with dislocations of the carpus are epitomes of Speed's excellent monograph on "Traumatic Injuries of the Carpus", published by Appleton in 1925. Some of the illustrations in this work are taken from the monograph and a number of new illustrations have been added. Pages 585 to 735 are an excellent treatise on fractures and dislocation of the femur.

Speed properly insists upon the immediate reduction of fractures of the leg bones, either in the shaft or above the ankle, and also properly insists upon active motion but delayed weight bearing in the latter group.

Chapter Twenty-three is a splendid consideration of fractures of the bones of the foot. In the treatment of recent compression fractures of the os calcis into the astragalo-calcaneal joint we believe that early subastragaloid arthrodesis is of such proven advantage in reducing the disability in this type of fracture that it can no longer be regarded as a "fad" and therefore merits mention in the treatment of these fractures.

In so splendid and comprehensive a work we miss a bibliography and a consideration of pathological fractures. Speed's book is a thoroughly practical treatise with concise text and profuse, carefully selected illustrations.